

# inCider

# A+T

## Apple II / Macintosh

# CREATING ART & MUSIC

8 Low-Cost  
Paint Programs

Carry a Tune  
With Your II  
or Mac

## REVIEWS

- Design Your Own Railroad
- Super GS Award Maker
- Children's Newspaper Maker

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August 1991

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EDITORS' CHOICE P. 80



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GS+ Magazine



## If You Use...

- Appleworks GS
- Managing your Money
- Printshop GS
- HyperCard GS
- Springboard Publisher
- DeluxePaint
- Quicken • Publish it 3,
- or any other GS software - Then you need a Zip GS.

## Here's Why...

To use powerful programs you need a powerful computer. Apple Computer left one thing out of the II GS when they designed it...speed. The Zip GS puts the speed back in. The Zip GS comes standard with 8 K cache memory and runs at a very speedy 7 Mhz. The Zip GS gives you all the speed you need now and in the future because it's expandable. You will never have to buy another accelerator card again. All upgrades are available now.

Can you imagine the time you will save having your GS running up to 10 Megahertz faster. Appleworks performs like you always thought it should, recalculations in the blink of an eye. Word processing faster than on the new line of Macintosh computers. Nibble magazine said it this way "Apple Computer take note: this chip makes a full featured GS word processor faster than several Macintosh word processors running on a monochrome display." (monochrome display is the fastest) Hallelujah! ZIP GS DELIVERS!

## ZIP GS

- Is very easy to operate.
- Needs no special boot-up.
- Provides Macintosh speeds for your GS • Is compatible with all GS hardware and software.
- Uses 1/10 the power of competing boards.
- Address all memory.
- Upgradable to 64 K cache memory.
- 16 variable speeds at the touch of a key.
- 30 day money back guarantee and a 1 year warranty.
- Upgradable to 10 megahertz.
- Fully DMA compatible.

## Installation

Anyone can install the Zip GS in a matter of minutes. To help with the installation, we include an animated pictorial instruction manual which gives detailed instructions on installation and operation.

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The Zip GS can be upgraded at any time. Zip Technology has available upgrade kits that boost the speed to 10Mhz! We will be happy to do the upgrade labor for free within 48 hours.

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SOFTDISK is a monthly software collection designed for the Apple II. Every month we send you two 5½" disks or one 800K disk packed with original new programs for your Apple II. What kind of software? Practically anything you can do with an Apple II computer. After 120 issues of SOFTDISK, our editors really know how to provide you with Apple II software you can use.



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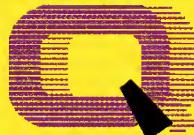
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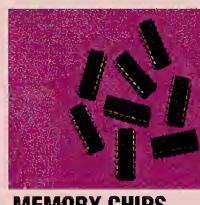
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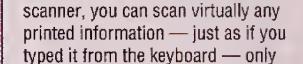
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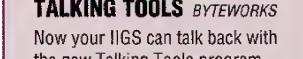
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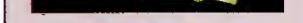
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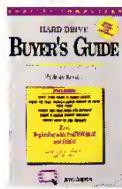
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Howard J. Dillon  
Las Vegas, NV

...the Q Drive software is so easy to use that it practically sets up the drive itself.

*inCider Magazine*

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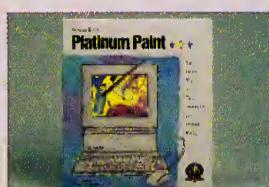
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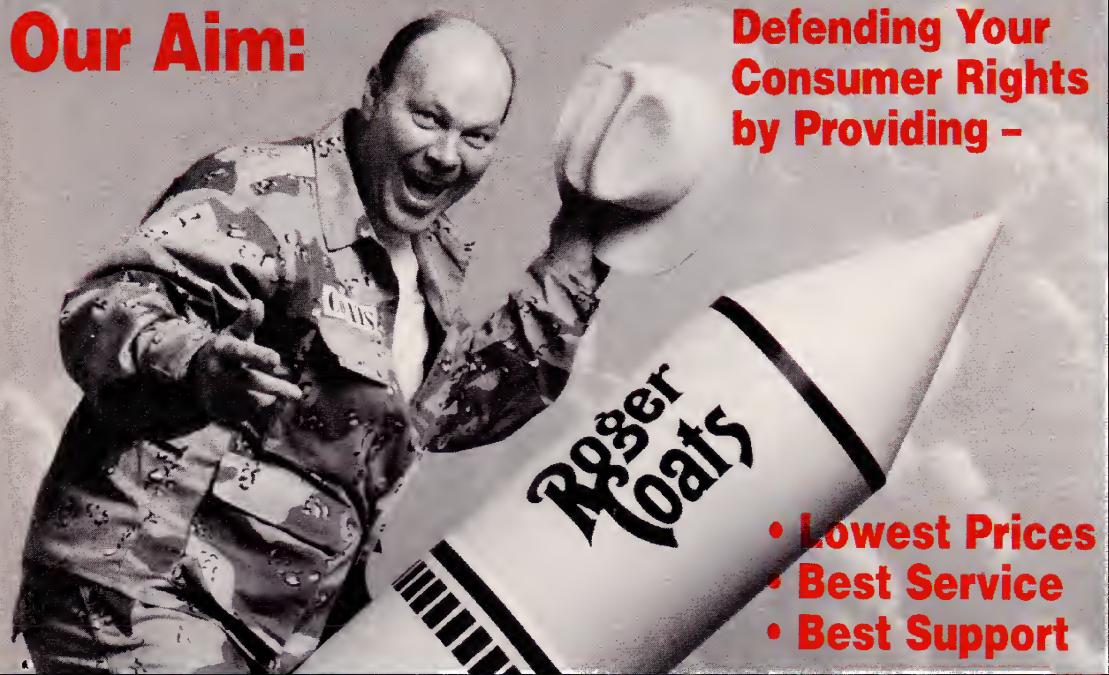
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Let your visual imagination run wild — a good paint package and a graphics-smart computer like the Apple IICs or the Macintosh LC can put the fun back into creating. With pixels as your medium and the mouse as your tool, Mac and GS programs help you discover the artist within.

### 40 Command Performance

Listen to what music lovers are doing with Apple IIs, IIGSes, and Macs as their instruments. Want to sing like a Baptist choir, swing from country to rock as quick as the Kentucky Headhunters, or soar in symphonic power like the Boston Pops? For teaching, performance, and composition, in classrooms, concert halls, and studios, Apple IIs and Macs deliver a powerful sound.

### 44 The MIDI Beat

How does one person play *A Bicycle Built for Two* in three-quarter time on four instruments? Through the magic of MIDI, of course. Whether you're a performing musician, a composer, or someone who just likes to tweak notes in your basement, you can plug in your synthesizer and let your Apple pump up the volume. All together now . . .

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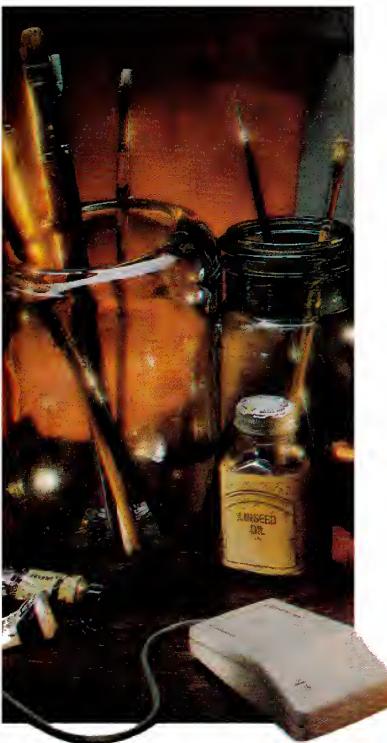
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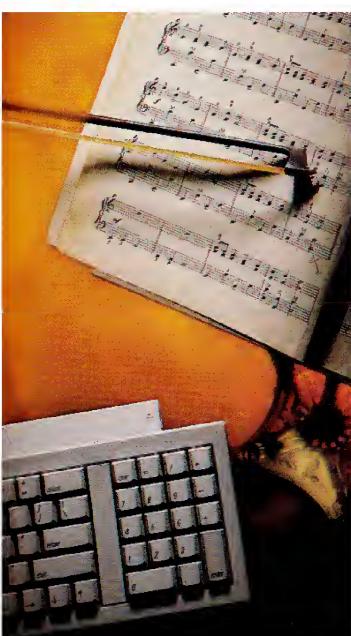
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## SYSTEMATIC GAMBLE: APPLE ROLLS A 7.0

**Apple's upping the OS ante — System 7 will change the way computer users judge integration.**

When the Macintosh was first introduced in 1984, I was doing the majority of my work as managing editor of *Microcomputing* magazine on an MS-DOS computer running WordStar and 1-2-3. When our two just-released 128K Macs arrived, however, I quickly snagged one for my desk. It was obvious even then that the Mac had a lot going for it. With its desktop, or Finder — or whatever you choose to call that unique look and feel — the Macintosh was simply different and,

to many, better. The only question back then was whether or not the Mac would generate the same software-development effort the Apple II did. It did, but it didn't happen overnight. Early users spent a lot of time waiting for their computer and waiting for software. The Mac eventually gained momentum, though, and pointing and clicking became a way of life.

Over the years other systems have emulated the Mac successfully. No one does it as well, but just about every computer from the Commodore 64 to DEC's MicroVax takes advantage of mice, overlapping windows, and fonts these days. Most recently,

Microsoft's Windows has been nipping at Apple's GUI (graphical user interface) heels. It doesn't turn an MS-DOS clone into a Mac, but, as the expression goes, it's close enough for government work. When Windows 3.0 hit the streets last May, it was clear that Apple needed to up the ante, and it has. System 7, Apple's new operating system, is an ingenious accomplishment that puts some distance between the Mac and the competition.

Does that mean you should rush out and plunk down your \$99 for an upgrade kit? Maybe not just yet. The price of entry to 7.0 isn't steep, but it's there. I've installed System 7 on an SE/30 with 5 megabytes of RAM and haven't noticed any major performance degradation. Paul Statt, however, running the new operating system on his LC with the 7.0 minimum of 2 megs of RAM, reacted with language I don't dare repeat here. (Well, it may be slow, but System 7 sure looks nice on his color LC.) If you upgrade, plan on at least 2.5 megabytes of RAM.

In addition, some of 7.0's features won't be available immediately. The premise and the promise of System 7 center around sharing files and information among applications and among users. These highly touted features — "publish and subscribe," "interapplication communication," and "Apple events" — take cut and paste a big step further. If you want to share your drawing of a dog with other dog lovers, for instance, you can select the graphic and then publish an "edition" containing it. If anyone is interested, he or she can "subscribe" to it. But applications will have to be revised to implement this level of communications.

Educators, however, may not want to wait. System 7's peer-to-peer networking capabilities will be tempting for anyone running AppleShare. With 7.0, you can reclaim that Mac you've been using as a dedicated file server; now any Mac on the network can share files with other Macs.

System 7 will change the way computer users judge integration. If you want to move forward with your Mac, it's inevitable that you'll upgrade. Even if you don't want to share anything, there are other 7.0 temptations: on-line balloon help, easier font and desk-accessory installation, a more flexible find-file feature, and more.

Unless you're on a network, however, our advice is to move slowly. In fact, you may want to wait for 7.0 to become 7.1. Why? It's fun now to reminisce about those first Macs, but I'm sure the people who bought them didn't enjoy their expensive pioneer experience. The potential's great, but we expect that 7.0 will experience the same sluggish first year the original Mac did. □



**By DAN MUSE \* EDITOR IN CHIEF**



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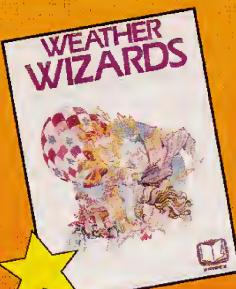


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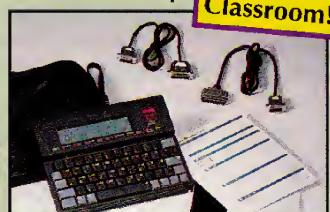
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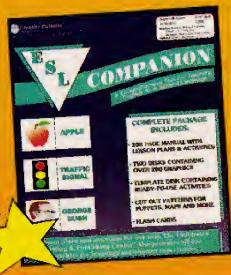
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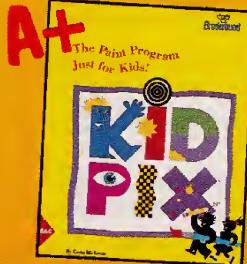
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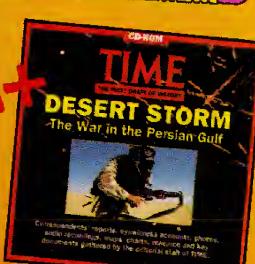
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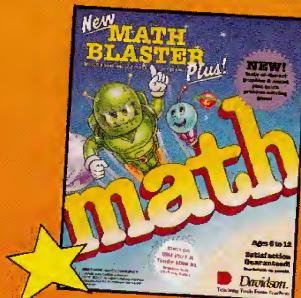
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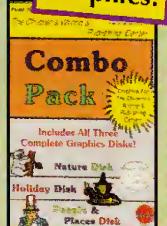
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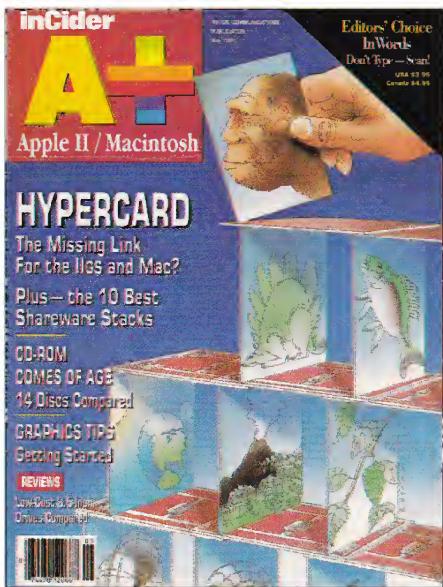
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# LETTERS



## LEGALLY BLIND

**I** READ WITH GREAT INTEREST Dr. Bruce Williams' letter in the May issue. (See "Family Computing," p.14.) As legally blind IIGs users, my wife and I have experienced numerous frustrations.

The biggest problem is the lack of information provided by Apple on modifying or otherwise working around the Finder — the pointer is too small, the desktop background color provides insufficient contrast with the windows, and the list goes on. As novice users, we don't understand ProDOS intuitively and our GS documentation told us nothing about launching programs from outside the Finder. Nor do we know how to adapt AppleWorks for speech, although we own both Echo+ and Slotbuster speech synthesizer cards.

Our quest has taken us through numerous telephone calls to Apple's customer service/special needs center (only marginally helpful) and placed us in contact with "Closing the Gap," a special project concerned with adapting technology for handicapped users. Getting information on adapting the IIGs

to make it useful "out of the box" seems much harder than it should. Even Apple was unable to give us any useful information.

I'd like to hear from other challenged Apple IIGs users, especially those who are visually impaired. You may respond via cassette, Braille, or inkprint. Anyone who can tell me how I can make AppleWorks accessible to my wife via speech synthesis, or how to launch programs without the Finder, please contact me soon. Let's communicate!

**Paul Shallbetter**  
**604 Southwest First Street**  
**Faribault, MN 55021-5806**

*The PACER Computer Resource Center is a nonprofit organization specializing in providing alternatives for handicapped users of all hardware platforms. Contact them at 4826 Chicago Ave. South, Minneapolis, MN 55417, (612) 827-2966. Direct your inquiries to Judy Simon, computer-resource coordinator. — eds.*

## NO REGRETS

**G**REGG KEIZER'S COMPARISON of the Macintosh LC and the Apple IIGs was interesting, but we object to Mr. Keizer's comment that IIGs owners who buy a Q-Drive will "regret it later." (See "Side By Side, Head To Head," June 1991, p. 22.) We've shipped thousands of Q-Drives since their introduction last fall, and they've proven to be the most reliable hard drives we've ever sold. Few Q-Drive owners "regret" their purchases.

Mr. Keizer's contention that the Q-Drive eats up a lot of desk space is ridiculous. It fits snugly between the IIGs and a monitor, or you can stand the drive on its side beside the IIGs. But that's not the point. Desk space is usually the least important concern for hard-drive shoppers. Don't overlook the Q-Drive's many advantages over internal drives. Because the Q-Drive

is a SCSI hard drive, it can move with you to a Mac or a PC. You can also connect additional SCSI devices without using up slots, and you can speed up your SCSI chain with the RamFast/SCSI card — an option that isn't available to internal drives.

I can't imagine why anyone would pay more for a drive that offers none of these features. For the difference in price between the Q-Drive and a comparable internal drive, you could buy the RamFast/SCSI card. Why pay more just to keep the hard drive off your desk? If your desk is like mine, a little less clutter won't make a visible difference anyway.

Actually, the following quote sums it all up nicely: "An internal hard-disk drive costs more than an external one, runs more slowly, turns up the heat in your Apple IIgs or IIe and probably won't work in the next computer you buy. So why buy one?" If that looks familiar, it should — it's from the December 1990 issue of *inCider/A+!* We couldn't agree more.

**Joseph P. Gleason**  
**President, Quality Computers**  
**20200 E. Nine Mile Road**  
**St. Clair Shores, MI 48080**

*As journalists, we should be used to seeing statements taken out of context. The quote Mr. Gleason refers to is from the "Apple II Holiday Shopping Guide," (December 1990, p. 57). We go on to answer our rhetorical question by recommending the Applied Engineering Vulcan internal hard drive.*

*We have nothing against the Q-Drive and didn't intend to single it out as a product someone would regret purchasing. We mentioned it only as an example of an affordable external hard drive. The point we were making is that no one should overlook the many advantages of desk space. Users suffering from "peripheral overload" giggle uncontrollably at the thought of having a space to maneuver their mouse or operate a hand-held scanner.* — eds.

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**CAUTIONARY TALES**

**O**N RECEIVING YOUR MARCH ISSUE I noted the advertisement for Zip Chips from Computer Enhancers and sent them a check with my order. Although the company cashed the check, I haven't received anything. Computer Enhancers hasn't answered a follow-up letter, nor has a representative answered its phone. Can *inCider/A+* exert any influence on the company to get it to act responsibly?

**David Herbert**  
2009 Klamath River Drive  
Rancho Cordova, CA 95670

*David, your letter is one of many we've received concerning Computer Enhancers. We tried to contact them several times, both by phone and by mail, with no success. At press time, however, we received a letter from Bruce MacIntyre of Computer Enhancers, which included the following statement: "Computer Enhancers regrets its present circumstances and inconvenience to its customers and will right the situation just as fast as possible." —eds.*

**GEOCENTRIC**

**D**ONT GET ME WRONG. APPLEWORKS is fine, but GEOS (graphic-environment operating system) should be more popular. I enjoy having Mac-like windows on my Apple IIe, the endless features, the ease of use, and, when loaded into my 512K RamWorks III, the speed. When you consider geoPaint and geoPublish, not to mention the many desk accessories available, GEOS is more powerful than AppleWorks. And, with Berkeley Softworks' Creativity Disks, I have over 40 fonts from which to choose.

When I bought GEOS, I subscribed to *geoWorld* magazine, which was great for those owning Commodores. Is there an Apple GEOS user group out there?

**Geoff Malta**  
5263 Deborah Drive  
Piscataway, NJ 08854

**I**N CIDER/A+ WELCOMES READERS' COMMENTS. WE RESERVE THE RIGHT TO EDIT LETTERS FOR CLARITY, STYLE AND SPACE. PLEASE ADDRESS YOUR CORRESPONDENCE TO LETTERS, IN CIDER/A+, 80 ELM STREET, PETERBOROUGH, NH 03458.

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Fully DMA Compatible .....	w/1 MEG	\$99
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AEGS-RAM+ 6 MEG RAM board w/1 MEG		\$189
256K RAM SET (8pc) Lifetime Wty .....		\$18
256K RAM 3 Set Special (24pc) .....		\$49
1 MEG RAM Set (8pc) 5 Yr Wty .....		\$55
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**PRO-KEYPAD for IIe/IIc**

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**PRO KEYPAD for U.S. & European IIe**..... \$34

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**MORE SUPER SPECIALS!**

**Graphic Parallel Board** w/6ft cable. Text & graphic screen prints. Versatile graphics including inverse/normal, enhanced, 90 degree rotate & double size print. II+/e/gs. .... \$44 |

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**Z80 CP/M Board** Opens the CP/M world for II+/e/gs. Microsoft & Turbo Pascal Comp....

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**6 AMP Power Supply**. Drop in replacement for II+/IIe supply. Double the amp power! ... \$49 |

**TV Modulator** Connects your Apple II+/IIe to any color or black/white TV ..... \$15 |

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**AE Transward** 3.6MHz accelerator. II+/e/... ..... \$99 |

**ZIPCHIP 8MHz** by Zip Tech. IIe/IIc ..... \$159 |

**DISK DRIVES!**

**Disk Drive H/H** for Apple II+/IIe..... \$119

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**Disk Controller BD 5.25"** II+/IIe/IIgs ..... \$34 |

**AMR 3.5"** Drive ..... \$194 |

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# WHAT'S NEW

## MS-DOS APPLEWORKS

We've taken some heat for writing about Mac products — so what would you say to an "MS-DOS clone" of AppleWorks 3.0? Remarkable Technologies' SuperWorks (\$199), has caused more than one double-take around here. SuperWorks functions like AppleWorks on any IBM PC/XT/AT/PS or compatible with 256K of memory (512K recommended) and a disk drive — except that it's faster and the alternate (Alt) key does the job of the open-apple key. It also looks great on a color monitor. You can even change the colors of underlined or boldface text, for instance.

If you use AppleWorks and can train your fingers to find their way around an MS-DOS keyboard, you can use SuperWorks. It even incorporates some features for which AppleWorks users pay extra, such as a macro programming language, telecommunications, a visible clipboard, seamless cut and paste between files, and the ability to hold as many as 126 files on the desktop at any one time. The SuperWorks spreadsheet not only imports Lotus 1-2-3 (as well as AppleWorks) files, it also uses Lotus' unique "3-D" spreadsheet model to let you combine data from many files.

If you have years of AppleWorks experience (but less money than loyalty invested in Apple) and you want to make that next computer an MS-DOS — SuperWorks is for you. You could even type in one of Ruth Witkin's templates. For more information contact Remarkable Technologies at 245 Pegasus Avenue, Northvale, NJ 07647, (201) 784-0900, or circle 351 on the Reader Service card. — P.S.

## A CREATIVE CHALLENGE

**F**or the physically challenged and developmentally disabled, a personal computer can make the difference. That is, the difference between busy work and productive careers; the difference between hiring someone to read books aloud and reading for pleasure themselves; the difference between watching basketball games on TV and playing them on the computer; the difference between being victims of circumstance and taking charge of life.



But the technology that really makes a difference in people's lives isn't always listed in the catalog of the company that makes the computer. That's why Johns Hopkins University is sponsoring a search for ideas in "Personal Computing to Assist Persons with Disabilities" this year.

A similar search, conducted by Johns Hopkins ten years ago, highlighted the Apple Adaptive Firmware Card for the Apple II. (It was one of over eight thousand entries.) This card has made possible hundreds of software solutions for physically challenged and developmentally disabled persons, because it lets them use

off-the-shelf software. Johns Hopkins also spotlighted a Braille word processor, an ultrasonic head control for wheelchairs, and an eye-tracking system that lets a person manipulate a computer using his or her eyes only.

Paul Hazan, project director, expects that this year's search will affect even more people: "In 1981 there were fewer than a quarter of a million personal computers in the hands of Americans. Today there are about 20 million —

almost a hundredfold increase — with a commensurate increase in the number of creative people who are computer literate."

Hazan also notes that "the equipment is much more capable," but don't worry about yours — it makes no difference if you're using an Apple II Plus or a Mac IIIfx. Your entry can be hardware or software, and the competition is open to computer professionals, students, and amateurs. Entries will be recognized in four areas: employment, independent living, education, and leisure. Regional fairs across the country will display winning entries on the way to the national fair and awards ceremony at the Smithsonian Institution in Washington, DC, on February 1 and 2, 1992.

The grand prize is \$10,000, and more than 100 other prizes will be given for the best ideas, systems, devices, and computer programs. But more important than the prize money is the goal of making the public aware of challenges some people face, and the creative, innovative ways they meet them.

The deadline for the competition is August 28, 1991. Anyone who wants to enter should request an entry flier by writing to Computing to Assist Persons with Disabilities (CAPD), P.O. Box 1200, Laurel, MD 20723. — P.S.

## NEW-PRODUCT FOCUS

▲ MAC ◆ APPLE II ■ APPLE IIgs

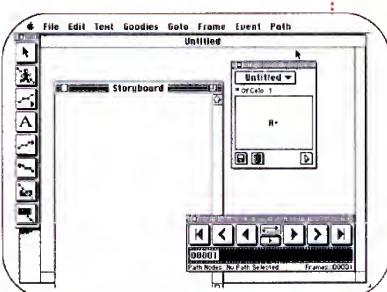
### NEW SOFTWARE



#### Animation Works

It used to cost a fortune and take weeks of training to create animated moving pictures on the Macintosh, but with **Animation Works** (\$199.95) Gold Disk has dropped the price for schools and straightened the learning curve. The **Animation Works Education Lab Pack** costs only \$475, and you can use it with as many as five Macintoshes.

Animation Works consists of a Cel Editor for creating animated characters called cels, a Background Editor for drawing relatively static scenery, and a Movie Editor that combines cels and backgrounds. Teachers will be able



to animate every kind of lesson, from plant growth to sentence building, from the physics of space flight to the interior of the atom.

Animation Works imports Macintosh-standard audio files (MacRecorder and SND) and graphics files (PICS and PICT), and can be used with HyperCard, as well. Animation Works movies can run on anybody's Macintosh, even if he or she doesn't have Animation Works.

For more information contact Gold Disk at 20675 South Western Avenue, Suite 120, Torrance, CA 90501,

(213) 320-5080 (in Canada reach the company at 5155 Spectrum Way, Unit 5, Mississauga, Ontario L4W 5A1, 416-602-4000), or circle 353 on the Reader Service card.

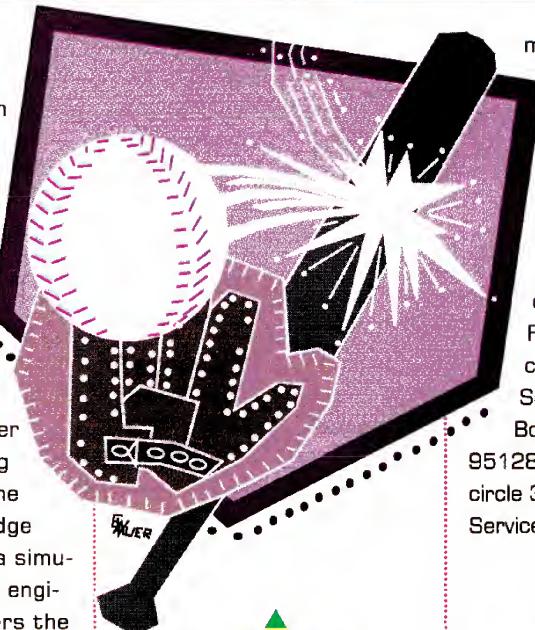
#### Bridge Builder

Bored with computer games and seeking new ways to have some fun? Try building a bridge with **Bridge Builder**, a simulation developed by an engineer to teach beginners the gentle and difficult art of connecting two riverbanks with a road.

Playing with Bridge Builder is fun, but you learn some pretty serious engineering topics such as force, stability, efficiency, and strength as you tie steel girders and joints into a simulated bridge. To test your bridge, you drive a simulated 80,000-pound truck across it. Will it crash?

Bridge Builder gives students and anybody else a harmless playground where they can experiment with engineering. This "trial and error" approach with simulation is the way engineers work, and Bridge Builder offers a fascinating introduction to this field.

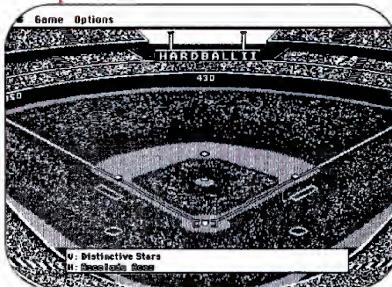
Bridge Builder costs only \$36 from Pre-Engineering Software, 1266 Kimbro Drive, Baton Rouge, LA 70808, (504) 769-3728. For more information contact the company or circle 354 on the Reader Service card.



#### Playin' HardBall II

Following on the heels of **HardBall** is Accolade's **HardBall II** (\$54.95) for the Mac. It's as easy to play as the original — it uses the same interface as the Apple II and IIgs versions — but stars improved animation.

HardBall II also includes more major-league ballparks — a total of seven — which make playing an entire season much more fun. Perhaps in response to the Rotisserie League fad, Accolade now lets you store



more player statistics on disk. If reliving moments of glory in statistics bores you, you can replay them with HardBall II's **TV Instant Replay**. Another major-league improvement is the ability to shift the positions of your fielders for each batter.

All in all, HardBall II is just

more true to life — or to television, if that's how you take your sports. It requires a Mac with 1 megabyte, supports color on the LC and II series (needs 2 megabytes) and uses off-disk copy protection. For more information contact Accolade at 550 South Winchester Boulevard, San José, CA 95128, (408) 985-1700, or circle 352 on the Reader Service card.



#### Cosmic Wizardry

**Wizardry: Bane of the Cosmic Forge** (\$59.95) has captured the title of Top Role Playing Game, according to the readers of Computer Gaming World, and now it's after the hearts and minds of Mac users everywhere. But first, Mac players will need to forget their Apple Macintosh windows and pull-down menus.

Sir-Tech Software felt that the computer power needed for combining action and adventure simply asked too much of the Apple interface. So Sir-Tech wrote its own. This game requires 1 megabyte of memory, and 1800K of system memory must be free on color Macs (800K on black-and-white). To install it on a hard drive, you need 2.5 megabytes of free disk space.

In the best tradition of fantasy role-playing, this game calculates your every step — and the full-color animated graphics will knock your armor off.

Contact the company at P.O. Box 245, Ogdensburg Business Center 2E, Ogdensburg, NY 13669, (315) 393-6633, or circle 355 on the Reader Service card.

## NEW-PRODUCT FOCUS

**School Days**

If your school has assembled a motley crew of mature Apple IIs, Macs of a certain age, and old MS-DOS computers, **SchoolWorks:Department Head** may be the solution.

This product is a set of templates designed for use with AppleWorks on the Apple II or IIgs, or for use with Microsoft Works on the Mac or an MS-DOS compatible. From the principal's office to the classroom, these templates help you inventory supplies, write, revise, and review lesson plans, record your classroom observations of teachers, and file their addresses, telephone numbers, and other pertinent information.

The documentation is in the software, and the \$55 purchase price includes a site license for your entire school — it makes sharing information simple and legal. For more information contact K-12 MicroMedia Publishing at 6 Arrow Road, Ramsey, NJ 07446, (800) 292-1997, or circle 356 on the Reader Service card.

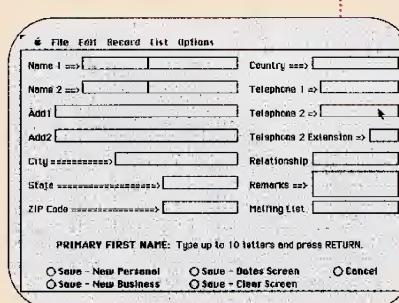
**Address Master**

**L**ooking for an easy, inexpensive way to keep simple records on your Apple IIgs or Mac? Try Prelude Software's **Address Master** (\$39.95).

Address Master lets you maintain multiple files of names, addresses, telephone numbers, and other data. You can sort records and print them as mailing labels, then sort them by ZIP code to take advantage of lower postal rates. You can also print a pocket-sized address book.

A unique feature of Address Master is that the Apple IIgs and Macintosh versions can

each use and process files created on the other — as well as on the MS-DOS version. For details contact Prelude Software at P.O. Box 1317,



Costa Mesa, CA 92628-1317, (714) 751-5736, or (800) 678-7613, or circle 357 on the Reader Service card.

## NEW HARDWARE

**I Need My Space, Dude**

**H**ard drives have been shrinking in size and price, and growing in capacity. Plus Development Corporation is working on the Macintosh Classic market with the Impulse series of SCSI storage devices. The **Impulse 105/C** (\$599) is 105 megabytes tiny, as it replaces Apple's standard hard drive and meets the unusually low-power restrictions placed on the new Macs. For more information contact Plus Development Corporation at 1778 McCarthy Boulevard, Milpitas, CA 95035, (408) 434-6900, or circle 358 on the Reader Service card.

External enthusiasts should check out Tulin's 120-megabyte **Half Shell** for the Apple II and Macintosh. It's platinum, it's SCSI, and it's half the size of an Apple 5.25-inch drive. Tulin claims an average access time of 19 milliseconds, but with a list price of \$789, which includes an Apple

High-Speed SCSI card, blazing speed may not be a factor. For more information contact Tulin at 2156H O'Toole Avenue, San José, CA 95131, (408) 432-9025, or circle 359 on the Reader Service card.

**Hard Disk with Everything**

**A**s the prices of external SCSI hard-disk drives for the Apple

II drop, you probably aren't surprised to hear that a 100-megabyte Quantum subsystem drive with a 12-millisecond effective access time, drive heads that park themselves automatically, a push-button SCSI ID selector, RAM caching, and a full one-year warranty is available for only \$599.

But would you believe that **Resource Central's 100-megabyte drive** also includes on the disk, at no extra charge, every issue of **A2-Central/Open-Apple** ever published, a complete set of **Apple Technical Notes**, sample issues of **8/16-Central** (for programmers), **Stack-Central** (for HyperStudio users), **TimeOut-Central** (for AppleWorks and TimeOut users), and **Hyperbole** (for literary types curious about hypermedia), in addition to the usual roundup of public-domain and shareware utilities, graphics, patches, font editors, icon editors, and games?

Believe it. Resource Central also sells a **42-megabyte hard-disk drive** with removable media (for foolproof backups and easy transport) for only \$699. These drives require a SCSI interface card (available separately from Resource Central) and will work with any

**MAC    APPLE II    APPLE IIgs**

Apple IIe, IIgs, or Laser Apple-compatible computer. (They work with Macintoshes, too, but you'll need to format the disk yourself and destroy all that value-added data.)

For more information contact Resource Central at P.O. Box 11250, Overland Park, KS 66207, (913) 469-6502, or circle 360 on the Reader Service card.

## NEW RESOURCES

**Special Topics**

**H**igh-school math teachers often wonder, "How can I motivate my students who are way ahead of everybody else?"

William K. Bradford's **Topics in Mathematics** series is designed with those students in mind. It's for academic achievers in middle or high school who want to study subjects not usually seen in high-school math classes — such as logic, probability, permutations, and combinations — and expand their knowledge of math and develop their thinking skills, too.

The program teaches each subject at two levels, making a total of six disks — Logic Level I and II, Probability Level I and II, Permutations, and Combinations. All six disks (also available for MS-DOS computers) cost only \$270, a savings of 50 percent off the \$90 price of a single disk. Bundles of two disks are \$90, at the same significant savings.

Contact William K. Bradford at 310 School Street, Acton, MA 01720, (508) 263-6996, (800) 421-2009, for more information, or circle 350 on the Reader Service card.

## NOTES

### USERS AND PROGRAMMERS Sharing the Power to Create

**AW Tip:** Put your creativity to work and expand your use of the AppleWorks Clipboard. Let's discuss several methods of exchanging data in AppleWorks 3.0.

- Open apple-C (OA-C) in all modules copies data to and from the Clipboard. OA-C copies database records, spreadsheet rows, columns, and blocks, and any portion of word-processing files into the Clipboard for direct pasting to files in the same or other modules. But when you copy information from the Clipboard it may land differently in the destination file. When you copy data from the database to the spreadsheet, for example, records become rows, categories become columns, and visa versa. (This feature is handy for manipulating numerical data in a database.) Providing that you've opened enough categories in the destination database file, when you move information, all data will transfer.

When you paste spreadsheet data into the word processor (whether it's copied to the Clipboard as a row, a column, or a block) each spreadsheet row will become a word-processor paragraph with tabs inserted between spreadsheet columns. Information from the database arrives in similar fashion — records become paragraphs with tabs between categories. When you copy word-processing data to either the spreadsheet or a database and no tabs are present in the source document, each line in the word processor will be copied to the first category of the corresponding database record, or the first column in the corresponding spreadsheet row. When tabs are present in the source word-processing file, though, the data will land in successive categories or columns when you copy it to the database or spreadsheet. Returns in the word processor paste the data in subsequent database records or spreadsheet rows.

Copying data to and from the Clipboard to the same type of file places information exactly as it appeared in the source file (assuming the tabbing is the same in a word-processing file or the number of categories is the same in a database file).

- OA-M in all modules moves data to and from the Clipboard.

This command's results are almost identical to the *Copy* command (OA-C), except it removes data from the source file. It uses less RAM, so favor it if your system has memory restraints. You can preserve the original data by working with a renamed backup of the original source file. AppleWorks won't allow movement of all the records from a database. Adding a "ZZZ" dummy record to your database lets you move all the records you want.

- OA-P in databases and spreadsheets prints data to the Clipboard.

Printing to the Clipboard is similar to printing on paper, except what you see on screen is all you print to the Clipboard. When you move data from the Clipboard to a spreadsheet or database all data will appear in either one spreadsheet column or one database category. Use this technique to combine two or more database categories. (See "AW Macros," April 1991, p. 18, for another method of combining categories.)

- OA-P in the database prints data to the Clipboard for mail-merge functions.

Although you can use this powerful command only in the database module, if you copy or move spreadsheet or tabular word-processing data to the database as described in the instructions above, you can employ this command on all data.

Also use the mail-merge function to create a boilerplate or glossary-type application by copying word-processing lines and tabs: Copy the data directly to the database via the Clipboard, then print to a word-processing document using the mail-merge feature. You can also use the mail-merge feature to copy data from selected categories in a database to the spreadsheet, or back to a database file.

**AW Macros:** The macro below changes all the values in the "Price" Category in the illustrated (or a similar) database by a factor entered by the user. This macro demonstrates using the Clipboard and spreadsheet in making numerical changes in a database. Start the macro with SA-P from within the database file.

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#### Database Template:

Stock #	Item	Dept	Price	Note	X1	X2
1001	Chair	Furniture	63.95	Dining	--	
1002	Table	Furniture	79.45	Oak top	--	
ZZZ	ZZZ	ZZZ	(This is a dummy record)		--	

#### Macro:

```
P:<adb : q = peek $0c54 : {Identify current file} :
msg ' Enter price change factor - (ie: .85, 1.15, etc.) - and press RTN ' :
$0 = getstr 6 : zoom : oa-1 : {Get factor, to MRL, and top of file}:
oa-m>t<oa-9 up rtn : {Move all but dummy to Clipboard}:
oa-q esc rtn up :
rtn rtn>temp.asp<rtn : {Create temporary spreadsheet}:
oa-m>f<right right right : {Move data to ASP - position cursor}:
msg ' Place cursor in price column - Press RTN to accept ' :
keyto 13 : {Get confirmation of position}:
right : oa-l>c1<rtn : {Insert new column}:
>@round(<left>*<print $0>,2)<rtn : {Type formula}:
oa-c>w<rtn down>.<oa-9 rtn oa-r:{Replicate formula}:
oa-c>tb<oa-9 rtn oa-1 oa-c>fv< {Strip formulas leaving raw numbers}:
oa-l>c<rtn rtn rtn>2<rtn : {Change layout to Fixed-2}:
left oa-d>c<rtn : {Delete column with old prices}:
oa-c>t<rtn oa-9 rtn : {Copy new data to Clipboard}:
poke $0c6c,0 : esc>4<rtn rtn : {Remove temporary ASP file}:
oa-q print str$ q : rtn : {Get back to database}:
oa-m>f<msg ' Operation Complete ' >!
```

## THE ARCHITECTURE OF SOFTWARE PIRACY

**"Interapplication communications" makes software piracy even more of a temptation.**

In the Computer Museum in Boston, Massachusetts, there's a computer made of Tinkertoys. Theoretically, it could run any program your computer can, given enough time and Tinkertoys. You see, any two computers are more alike than they are different: Each has several memory chips and one chip that adds numbers. Your computer, in theory, can run any program "written for" the IBM PC, the Macintosh, or the Apple II. It might require secrets from the program's writers that they're not willing to share — specifically

the "source code." It also might not run every program fast. But any computer is capable of carrying out any arbitrary calculation — and any piece of software, from VisiCalc to HyperCard, is just a string of calculations.

Every microcomputer is controlled by a program stored in its memory. John von Neumann realized that data and programs could be treated the same, and designed the first modern computer. His legacy is that I can give Microsoft Word to a colleague as quickly as I can give him or her a text file. It's easy — you may have noticed — to copy software.

Computer and software developers are running hard against this same wall — called "von Neumann architecture" — but from different directions. The software peddlers hope you don't notice that after spending 45 seconds installing your new program on your hard disk, you could do the same for every hard disk in the building in about 45 minutes. They wouldn't mind if you believed that it would work not only just on your *type* of computer, but solely on your *individual* computer, as well.

The inventors of the digital computer didn't foresee that computer programs would be bought and sold. They designed computers that would make it easy to run the same program on two different machines. They did foresee, and planned, that programs would be as portable as data, because unless two different computers could run one program, data and programs couldn't share the same physical space on a single computer, whether it contained transistors, vacuum tubes, or silicon chips. If one computer is to run different programs, programs must be easy to copy. Programs are designed to be portable.

I don't mean to give piracy a good name, but I just saw someone from Apple show off System 7.0 (the Mac's new operating-system software) and create an "alias" of his Mac's hard disk. An alias isn't a copy, but it works just like one on a network. The Apple representative bragged that he can now run all the (legal) software on his hard drive on any Mac on the same network. An "office on a disk," he called it. Another representative showed me how my LC, which lacks a math coprocessor and drafts complex documents slowly, can get a Mac IIfx on the same network to do its arithmetic for it — even using a different program. Why buy two copies?

I'm impressed. These are features, not problems, of System 7.0. (See p. 24 in this issue for more on the technology.) Apple says that this is only the beginning of a brave new world of "interapplication communications," which will tear down the barriers that separate individual computers as completely as Berliners demolished their wall in 1989. *Wunderbar*. But I expect problems.

Software piracy isn't going to go away because the Software Publishers Association convinces enough users it's wrong. It won't go away until computers are unable to run more than one program. But every new crop of computers and system software is making it easier, not harder, to use the same software on two or more machines. Good will won't do the trick. Perhaps site licensing will. But I'm glad I'm not in the software development business, struggling to keep pirates armed with machines designed for copying software from copying software. □



By PAUL STATT • SENIOR EDITOR

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## APPLE CLINIC

# BACKING OUT GRACEFULLY

**Is reverse on an ImageWriter II easier to find  
than it is on a Volkswagen Bug?**

By CECIL FRETWELL

### DOUBLE REVERSE

I PRINT LETTERHEADS, CHECKS, and so on with my ImageWriter II. Each time I print I must back the continuous-feed paper out of the printer manually before I insert my letterhead or check. Is there a simple command to make the paper reverse itself?

**Jerry Fingerman**  
**Richfield, MN**

*You don't mention the software package you're using, so I'm a bit in the dark. If you're using a dedicated accounting or finance program, you may be out of luck. If you're using a program that lets you send control codes to the printer (such as AppleWorks 3.0 or AppleWriter), your task is fairly simple.*

*The character code for the escape key followed by a lowercase "r" will make your ImageWriter II reverse line feed one line. If you know BASIC, the following code fragment will make the paper reverse one inch if your vertical pitch is set at six lines to the inch.*

```
10 PRINT CHR$(4); "PR#1"  
20 FOR I = 1 TO 6  
30 PRINT CHR$(27);CHR$(114)  
40 NEXT I  
50 PRINT CHR$(4); "PR#0"  
If you're using a word processor, insert six  
"ESC r" combinations to reverse your paper feed.
```

### VULCAN LOGIC

WHEN I USE THE QUIT OPTION from any Apple II software to get back to the Finder on my IIgs (which is equipped with an Applied Engineering Vulcan 40-megabyte drive), I receive the error message *EXPRESSLOAD ERROR: 114D*. It used to work correctly, but I messed up somewhere. Can you help me?

**Harold Miller**  
**Valley Stream, NY**

*The problem could be your Applied Engineering utilities. Older versions won't work under Apple's System Disk 5.0.4. If you think this is the case, contact Applied Engineering at P.O.*

## APPLEWORKS CLINIC

*By Claris Corporation and the National AppleWorks Users Group*

### HIDE AND SEEK

**Help! I deleted an AppleWorks file from a disk that contained my term paper. Is there any way to get it back?**

There's a good chance you can recover the deleted file, particularly if you stopped using the disk as soon as you deleted it. ProDOS, the operating system that manages the disk drives for AppleWorks, doesn't actually delete a file from the disk; it marks the file as deleted in the disk catalog and releases the space used by that file with newer data eventually, but until then you can recover the file.

**Copy II+** offers an "undelete" function (\$39.95; Central Pt. Software, 15220 NW Greenbrier Parkway, Beaverton, OR 97006, 503-690-8090). Just boot it up, select Undelete from the main menu, and follow the prompts to display a list of all deleted files still in the catalog. Select the file you want to recover and the program reverses the entry in the disk catalog. ProDOS will read the file once again.

Next, boot up AppleWorks and try to load the file onto the desktop. If the file is intact it will load as if nothing happened. If it doesn't, tell AppleWorks you want to create a new word-processing file from a text (ASCII) file, load the file onto the desktop, and clean it up. Press Open apple-S to save.

### DISAPPEARING DATABASE

**I wasn't able to load an AppleWorks GS database file onto the desktop recently. Fortunately, I had a backup. Is there any way to recover the damaged file if that occurs again?**

Congratulations for keeping a backup! There's no insurance quite as good as having another copy of your work.

Recovering damaged AppleWorks GS (AWGS) files depends on the extent and nature of the damage. You have little hope of recovering files that are damaged internally — that is, files with damaged headers or data. We know of no program

Box 5100, Carrollton, TX 75011, (214) 241-6060. More likely, though, your system files are corrupt. Try using the System Tools disk for Version 5.0.4 to re-install the operating system. Thanks to Floyd Zink and Jim Maricondo for their help answering this question.

## Is It Full or Not?

I'M TRYING TO CONVERT FILES from a DOS 3.3 5.25-inch floppy disk to a newly formatted ProDOS 3.5-inch disk. The process fails with a message telling me that the 3.5-inch disk is full—but there are still files left on the 5.25-inch disk. How can this be? An empty 800K 3.5-inch disk should be large enough to hold everything on the 5.25-inch disk.

**John Sackett**  
Dayton, OH

Information is stored on any ProDOS disk in 512-byte blocks. On a 3.5-inch disk, blocks 2 through 5 contain the root directory for the disk. Each file entry on any ProDOS disk requires 39 bytes, so a directory block can hold 13 entries. (The extra 5 bytes per block are used for system purposes.) If you multiply this figure by four, the entire root directory can only hold 52 entries. The first entry has information regarding the disk volume, such as its name, leaving 51 entries, each of which can be used to identify a file or a subdirectory name.

that can rebuild the internal structure of damaged AWGS files.

The odds are better if the problem is a bad disk or a damaged GS/OS directory. With Vitesse's **Salvation-Deliverance** you can reconstruct bad or damaged directories and volume bit maps (\$49.95; 13909 Amar Road, La Puente, CA 91746, 818-813-1270).

Another option is Glen Bredon's **ProSel-16**, an extensive collection of GS/OS utilities that recover files you can't access because of damaged GS/OS directories or disks (\$89.95; distributed by Charlie's Apple Seeds, 9081 Hadley Place, San Diego CA 92126, 619-452-1297).

Go back to your 5.25-inch disk. Because ProDOS wasn't designed to provide extension of the root blocks beyond the first four, I'll wager that a CATALOG will show more than 51 files.

The solution? Divide the information on your DOS 3.3 into subdirectories; ProDOS will extend subdirectories automatically as they expand.

## LASER UDC

I HAVE AN APPLE IIe WITH TWO AMR 3.5-inch disk drives and one DuoDisk drive. Utilizing the UDC card from the Laser computer in slot 5, how can I get AppleWorks to recognize all four drives?

**Emmett Woodward**  
Oregon, WI

If you first daisy-chain the two AMR drives to the computer, then daisy-chain the 5.25-inch disks at the end, AppleWorks should recognize the chain.

For this procedure to work, though, you need ROM version 4.0 or later in the Universal Disk Controller card (UDC). To determine what

you have, fire up BASIC to obtain its famous ] prompt character. Enter CALL -151 and hit the return key. The ROM monitor system announces itself with the \* prompt.

Now enter \$C515, where the second hex digit is the slot number for the UDC—in your case, slot 5. If you see the digits 4030, you have the latest ROM version. If you see an older version, such as version 3, or a date, your controller won't support the daisy-chain I described. (To receive an updated version of ROM, contact Laser Computer, Inc., at 800 North Church Street, Lake Zurich, IL 60047, 708-540-5022.) If you have version 4.0 and this work-around still doesn't work, you have a hardware problem that requires the assistance of a dealer or a repair service.

APPLE CLINIC IS A FORUM FOR ANSWERING YOUR QUESTIONS ABOUT APPLE II HARDWARE AND SOFTWARE. ADDRESS YOUR CORRESPONDENCE TO APPLE CLINIC, INCODER/A+, 80 ELM STREET, PETERBOROUGH, NH 03458. BECAUSE OF THE VOLUME OF LETTERS, MOST WON'T APPEAR IN PRINT, BUT WE'LL TRY TO RESPOND IF YOU ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE.

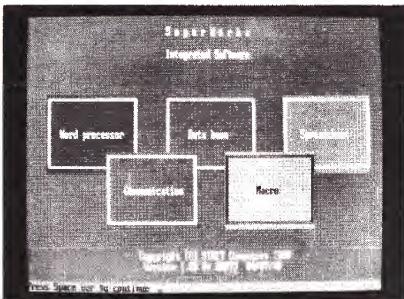
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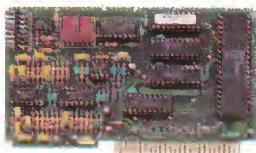
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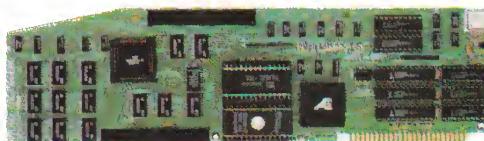


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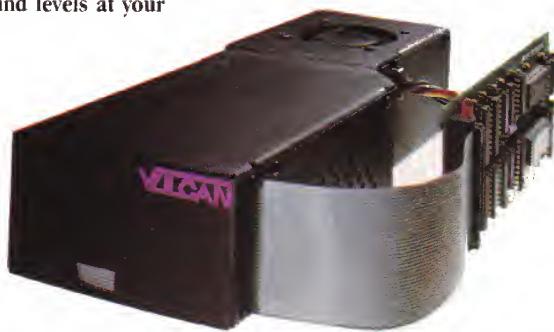


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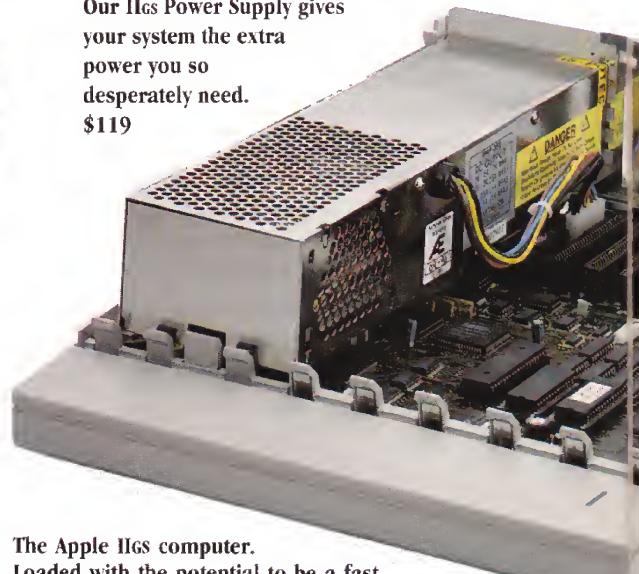
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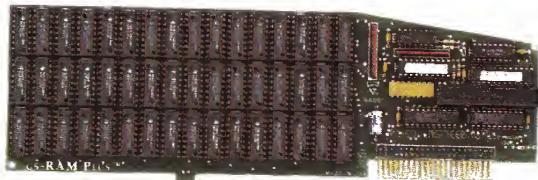
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MS-DOS compatible 5.25 Drive System (bottom) allows MS-DOS programs on 360K disks to boot from PC Transporter. From \$259

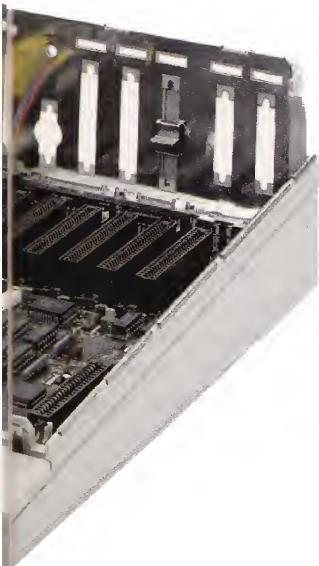
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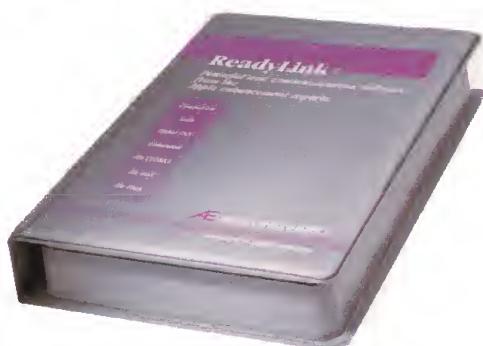
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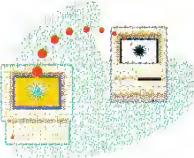
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# BRIDGING THE GAP

## LONG LIVE 7.0

Create new loyalty between Apple IIGSes  
and Macs with System 7.0.

By GREGG KEIZER

THE MAC IS DEAD. LONG LIVE THE Mac. No, the Crown of England hasn't just been passed on. It's something more important, at least to Macintosh users. System 7.0, the long-awaited revision to the Macintosh's operating-system software, has finally succeeded to the throne of the Macintosh empire.

Though not revolutionary in its changes, System 7.0 is certainly the most important — and the most dazzling — upgrade since the Mac's introduction in 1984. From its sharp *TrueType* font technology to its easier-to-use Finder, System 7.0 packs a wallop. It makes most Macs more powerful and easier to use, and for the foreseeable future guarantees the Macintosh's spot as king of the graphical computers. And then, strangely enough, System 7.0 will have an immediate impact wherever Apple IIs and Macintoshes work together.

One of the most effec-

tive ways to mix Apple IIs and Macs is with an AppleTalk network. By linking Apple IIGS and Mac computers with LocalTalk cabling, collections of machines can share printers and other peripherals, and most importantly, share files. Until System 7.0, a file-sharing AppleTalk network demanded that you dedicate a Mac as a file server — the computer and hard-disk drive combination that stores common files and runs AppleShare, the network software. But because you can't use the Mac file server for anything but running the network, AppleTalk networks are uneconomical for many schools and small businesses, and for virtually every home or home office. System 7.0 changes that. Its built-in file-sharing abilities let you bridge the gap without setting aside a Mac. Here's an overview of how it functions.

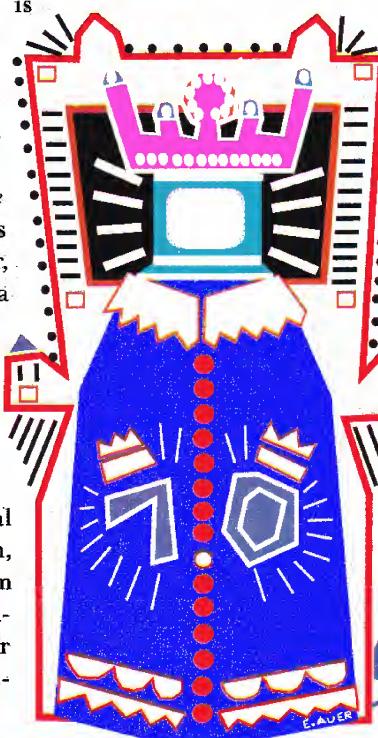
Grab a Macintosh. Any Mac that has 2 megabytes of RAM and a hard-disk drive will do. An LC works well, but additional memory always helps make operations run more

quickly. With System 7.0 running on the Mac, you simply choose a folder (or use the *File* menu to create a *New Folder*) that you want to share with others on the network, then select *Sharing* from the *File* menu. Up pops a dialog box, in which you click on *Share this item and its contents* and set access privileges, much as you do when you set up an AppleShare file server. (See **Figure 1**.) You can, for instance, let some users only view files while you let others modify them.

When you're finished setting up this shared folder, it shows up as an AppleShare volume or server on any computer you've designated with privileges. At another Mac, the folder shows on the AppleShare list in the *Chooser*, once you've clicked on both the AppleShare icon and the name of your file server, and followed the on-screen prompts. From an Apple IIGS, the folder appears when you click on the AppleShare icon in the *Control Panel*. Picking the folder from either list puts a new AppleShare icon on the desktop; double-click on the icon and it opens to show the contents of the folder (assuming privileges have been set to let you see those files). You're in business.

Let's take a simple example. Say your students write with **AppleWorks Classic** on two Apple IIGSes in the room. You have a Macintosh LC on your desk and pound out reports, notes, and assignments with **MacWrite II**. Through the magic of System 7.0 and MacWrite II's *XTND* (extended-command) translators, you can swap and share files with your students easily. (This technology lets you move a formatted AppleWorks document to the Mac — no ASCII step in between — and open it directly in MacWrite II, with all your tabs, underlines, and other settings preserved.)

Make two folders on your LC (one marked *In*, another marked *Out*), designate both as shared folders (choose *Sharing* in the *File* menu), and set the privileges so that all your



students have access. Then create folders within the *Out* folder for every student in your class and set the privileges so that each child has access to his or her own document only. As soon as a student finishes an assignment, he or she calls up the *Control Panel*, selects the *In* folder from the list of AppleShare volumes, double-clicks on the resulting desktop icon to open the folder, and copies the AppleWorks file by dragging it to the folder. At the end of each class, you open the *In* folder on your LC and move the files to your MacWrite II folder.

To review, comment, or change the student's work, fire up MacWrite II, select the AppleWorks translator from the list in the *Open File* dialog box (**Figure 2**), and open the appropriate AppleWorks file. MacWrite II's XTND translator converts the file to MacWrite II format automatically and retains the original formatting. You're free to comment or suggest changes to the assignment. Once through, you simply save the document as an AppleWorks file by selecting *AppleWorks 2.0* from the *Save As* dialog box, and move it to the *Out* folder.

The next day, students sit down at the IIgs and log onto the file server by clicking on the AppleShare icon in the *Control Panel*. Then they access and open the *Out* folder and their personal folders from your LC's hard-disk drive, and drag their work from those folders to their personal 3.5-inch disks. Now they can run AppleWorks, load the file, and see the changes and comments you've made. The entire process of accessing AppleShare volumes, opening folders, and transferring files takes only a little more time than it does to describe. And as in an AppleShare-equipped network no outside translation utility — not even *Apple File Exchange*, for instance — is necessary.

Your classroom network operates transparently while you have complete control of your Macintosh LC. Thanks to System 7.0, you have an economical network that lets you use the Mac while students send and retrieve files. The only price you pay is a slight slowing of your Mac when others get to its hard-disk drive.

#### LAUNCH AWAY

Wait! There's more! System 7.0 does more than just share files. With AppleShare-aware software, it can also turn your Mac into a launching pad for Apple II

## UPDATE: SON OF PRINTER POLYGAMY

AppleWorks never looked so good for so little. That's what you'll think the first time you push an AppleWorks word-processing, database, or spreadsheet file through a laser printer. Though they may not be filled with fancy fonts, laser-printed AppleWorks documents are clear and sharp. No more blocky characters faded by worn-out ribbons.

May's Bridging the Gap ("Printer Polygamy," p. 68) walked you through some Macintosh and IIgs printer-sharing solutions. PostScript printers make the most sense when you're mixing these two machines and using IIgs-specific software that supports PostScript. But if you're comfortable with AppleWorks Classic, you don't have to do without laser printing, nor do you have to spring for an expensive PostScript-compatible printer.

Hewlett-Packard's **LaserJet IIP** — an affordable laser printer that some analysts predict will sell for as little as \$750 this summer — works well with AppleWorks Classic (\$1295; Hewlett-Packard, 19310 Pruneridge Avenue, Cupertino, CA 95041, 800-752-0900). All you need is **HPII.SEG.ER.SHK**, a public-domain printer driver for AppleWorks 3.0. Available in America Online's AppleWorks software library (under New Files), this freeware program adds the IIP to your list of possible print destinations.

Installing HPII.SEG.ER.SHK takes only a few minutes. After you've expanded the squeezed file with **Shrink-It**, America Online's default compression utility for the Apple II, just copy the file SEG.ER to your AppleWorks disk, or to the appropriate folder if you're working with a hard-disk drive. Run AppleWorks, call up a document, and press Open apple-P. Your new printer choice should appear as HPII.LASER.

Calling on the IIP's internal fonts, orientation, and styles (Courier 10- and 12-point and Line Printer 8.5-point; landscape or portrait; normal, italics, and boldface) is as easy as inserting various CI and SC commands in the document. You can also access several other fonts, including a proportionally spaced Times Roman font, if you have the appropriate optional cartridge plugged into the IIP.

With the IIP laser printer and this new driver, you can squeeze more on an AppleWorks spreadsheet page (by using smaller type and printing in landscape mode), produce envelopes (though the IIP tends to wrinkle the envelope and/or glue shut its flap), and, of course, generate crisp-looking letters, reports, and other word-processing documents. Remember, too, that you can use the IIP with the Macintosh after you add a third-party package of printer drivers, such as Seven Hills Software's **Independence** (\$39.95; 2310 Oxford Road, Tallahassee, FL 32304-3930, 904-575-0566) or Vitesse's **Harmonie** (\$49.95; 13909 Amar Road, La Puente, CA 91746, 818-813-1270). It's just another way to bridge the printer gap when you have more than one machine on your desktop.

— G.K.

programs such as **AppleWorks GS** and **HyperCard GS**. Like a dedicated file server, System 7.0 lets you copy appropriate applications to a shared folder on a Mac's hard-disk drive via the network, then run those programs from your Apple II.

In another make-believe classroom, where an LC sits on the teacher's desk and three IIgs machines keep the kids company, three copies of AppleWorks GS get fed to IIgs 3.5-inch drives. There's gotta be a better way.

There is. Copy the AppleWorks GS files — using the network connection already established — to the LC's shared folder. Now, with the shared folder still on the IIgs desktop as an AppleShare icon,

double-click on the AppleWorks GS icon. Half a minute later (not blazingly fast, but still quicker than if you were running from floppies), the AppleWorks GS screen appears on the GS. You can write, paint, publish, crunch numbers, and find information to your heart's content.

HyperCard GS works with System 7.0's shared folders, too. That's a big plus for GS owners who can't drop a hard-disk drive next to each IIgs. HyperCard GS, which needs either a network or hard-disk drive, runs perfectly fine from a System 7.0 Mac.

Remember, though, that you must still obey the copyright laws when you're running Apple II software from a Mac-

# BRIDGING THE GAP

intosh. If you have three IIcses in the class, you'll need three copies of AppleWorks GS to avoid software piracy. (You put only one copy on the Mac, of course.) Check with the publisher of your favorite Apple II software for information on its AppleShare-awareness, as well as for details on possible site licenses or network packs.

## KEEP (APPLE)SHARING

System 7.0 and its file-sharing feature won't eliminate AppleShare and dedicated file servers managing dozens of machines. In fact, long sessions with System 7.0 turned up a major gaffe: You can't share from an Apple IIe.

Even when equipped with an *Apple II Workstation* card, my lab's IIe refused to recognize a Macintosh running System 7.0 as a file server. Well, almost refused to recognize it.

As long as I logged on from the IIe with the same user name and password as the Macintosh's owner, everything worked fine. (AppleShare, which System 7.0's file sharing mimics in many ways, requires that a server be tagged with an owner, usually the network administrator.) The entire contents of the Mac's hard disk were available to the IIe, and I could copy files from Mac to IIe and back. But all attempts to log on with other user names — names registered with the Mac's System 7.0, of course — met with utter failure. The AppleShare IIe Workstation software simply wouldn't recognize the Mac as a file server.

Because you can't connect to a System 7.0 Macintosh from an Apple IIe, except by logging on as the Mac's owner, there's no way to restrict access to a limited number of files. No teacher will want to give all his or her students free run of the Mac's hard disk, which will probably contain, among other things, grades and records of every member of the class. Plainly put, System 7.0 and Apple IIes don't mix.

That's just one reason System 7.0 doesn't make AppleShare obsolete. Another is System 7.0's limit on the number of machines that can access a folder-sharing Mac. Although there's no limit to the number of computers you can hook up to the network, only ten can connect to a

shared folder at a time. (As soon as one user drags the AppleShare icon off the desktop, another user can access the folder.) And because a Mac running System 7.0 can slow to a crawl when several linked computers are accessing its hard-disk drive at the same time (especially when it's launching Apple software), you may find the Macintosh all but unusable during peak sharing periods. But for small group connections, economical file sharing, and limited application launching, System 7.0 is great news for anyone mixing and matching Apple IIcses and Macs.

## THE HOME SHARING NETWORK

Be the first on your block to network your home. System 7.0 solves the bridging problem neatly for anyone who has

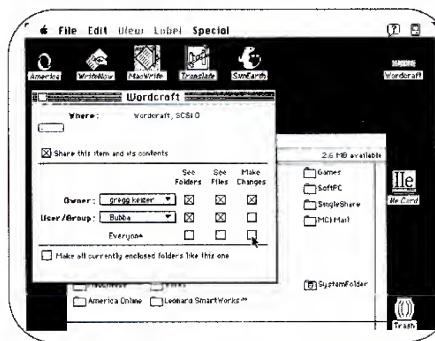


Figure 1. Set access privileges in System 7.0's dialog box.

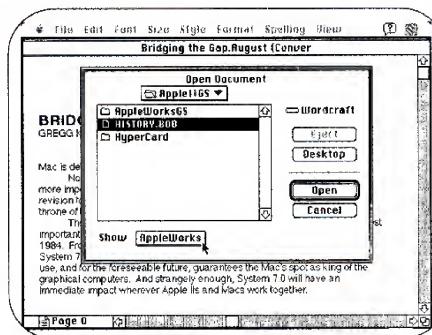


Figure 2. System 7.0 lets you open an AppleWorks file in MacWrite II.

both an Apple IIgs and a Macintosh in the same house.

Assuming you already have the Mac and IIgs, your only extra expense is a pair of **LocalTalk Connector Kits**. If you have the machines in different rooms — the IIgs in the kid's room and the Mac in your home office or den — use Farallon's

**PhoneNet** instead. PhoneNet uses existing phone wiring to route LocalTalk signals between machines, avoiding messy cables through floors or walls.

While you're hooking up the Apple IIgs and Mac, make sure you include your printer in the net. Whether it's an ImageWriter II or a low-cost PostScript laser printer, either machine can call on it when it's involved with AppleTalk.

System 7.0 and AppleTalk let your Macintosh stay a Macintosh, and your Apple IIgs remain an Apple IIgs. There's no mixing of applications, only a sharing of files, information, and data. But because that's what most people want from a network, who's complaining?

## NOT JUST FOR SHARING

Although it's a godsend for small-scale file sharing, System 7.0's mission isn't to make Apple IIgs users happy. But it will put a smile on any Mac owner's face.

Among its new features are such things as *TrueType*, Apple's scalable display- and print-font technology. (Instead of storing pictures of letters in various type sizes, this format uses the system file to store the directions for drawing each letter.) You'll see smooth type both on screen and on paper, in sizes from one to 32,786 points. No more jagged characters on the monitor, and you get near-laser-quality output even on an ImageWriter II.

Taking a page from the Apple IIgs, the Mac now boasts a simplified font and desk-accessory installation, whereby you simply drag icons into the System folder to add new fonts and DAs. And once application developers begin pumping out System 7.0-friendly software, you'll be able to take advantage of Apple's *publish-and-subscribe*, an automatic cut-and-paste feature in which copied graphics or text is updated in linked documents. You can share a document with others, and when you make changes to your original, the duplicates change, too.

There's more to System 7.0, lots more. **Alias** let you access a file or application from more than one place on your hard-disk drive. Alias icons act like miniature pointers to the real document or application file, so that when you click on an alias, it's as if you clicked on the real thing. You can create an

alias to represent logging onto an AppleShare volume or accessing another Mac's hard-disk drive, simplifying complex operations to a single mouse click. Further down the road is something called *inter-application communication* (IAC), which will let developers create ways for their programs to share information with, and even work alongside, other applications.

To top it all off, System 7.0 is a bargain. As of July 1, every Mac capable of running System 7.0 will have it pre-installed on the hard-disk drive before it leaves the factory. Earlier Macs can upgrade to System 7.0 in several ways. The least expensive means a trip to a user group or dealer, where you copy the System's eight disks onto your own floppies.

On-line services will also post 7.0 for downloading, though the connect cost will be prohibitive. The smartest method is certainly to plunk down \$99 for the **Personal Upgrade Kit**, which includes the software and two reference manuals. With all its new features, System 7.0 may take some time to learn, and the documentation will help.

Although Senior Editor Paul Statt has said in What's New that the current generation of Mac users doesn't need System 7.0 (see July 1991, p. 14), I disagree. Because of its ability to share files with Apple II GSes, its TrueType font technology, and its alias and publish-and-subscribe features, I think if you own a Mac, you need System 7.0. □

## PRODUCT INFORMATION

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**AppleWorks GS**, \$299

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5201 Patrick Henry Drive  
Santa Clara, CA 95052-8168  
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**HyperCard IIes**, \$98

**LocalTalk Connector Kit**, \$75

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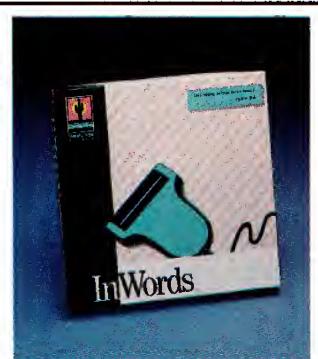
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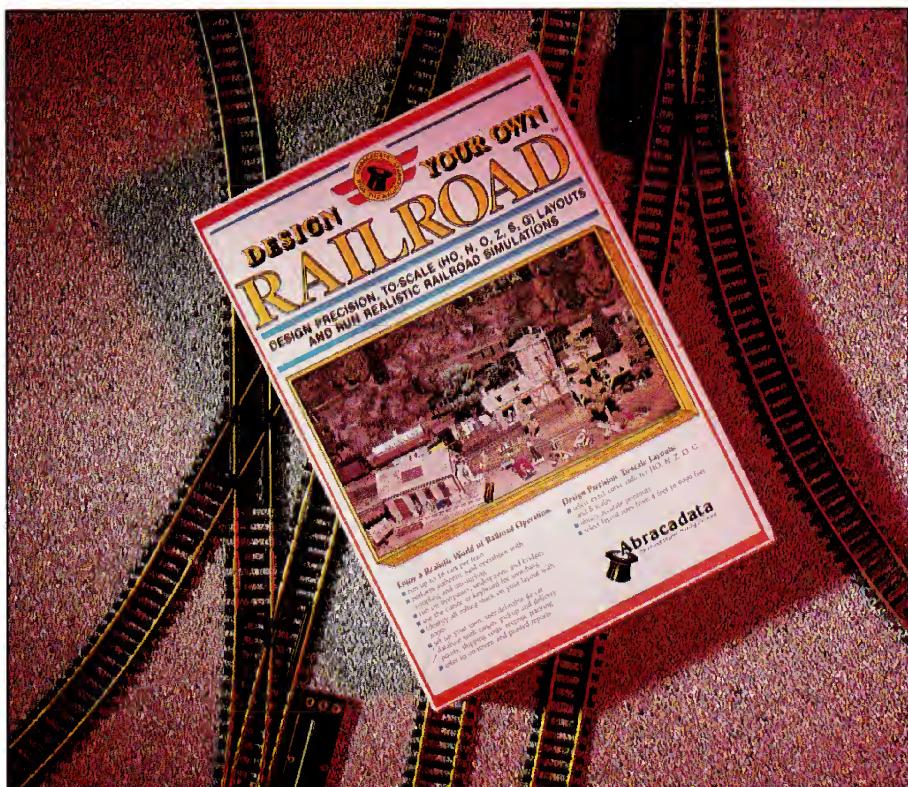
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# REVIEWS

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★ ★ ★ ★ ☆

For many Americans, railroads are a source of endless fascination. It's difficult not to be moved by the sight of a full-blown freight train in motion. The scream of the whistle and the clack of the wheels call up visions of a time when America was headed west on steel rails, with a full tank of water and a boilerload of coal.

If you've ever had the urge to don a railroad engineer's cap and couple a tender (a vehicle for carrying fuel and water) to a locomotive, Design Your Own Railroad

could make your dreams come true. Ride the rails as your train barrels through deep, cavernous tunnels or keep a watchful eye from the caboose as an old steam engine chugs over a precarious trestle bridge. Design Your Own Railroad has everything you need to stay on track.

This software consists of two programs in one package. The first application provides computer-aided-design (CAD) tools for crafting precision model-railroad layouts. The second incorporates seven

railroad games and lets you run trains over layouts you've created. You can monitor scheduling demands; complete reports; manage speed, direction, switching, and coupling; and devise strategies to make the train arrive on time.

The software requires only 64K to run, making it suitable for even an Apple II Plus. Because the model trains you put together navigate their routes on screen, rather than on a plywood layout, you save space as well as dollars. You don't need to purchase expensive track, rolling stock, or paraphernalia such as miniature figures, buildings, and landscaping. And with the action taking place on screen, you don't have to worry about maintenance chores such as cleaning track or repairing faulty electrical components. If you're really into plywood design, though, use this program to experiment with "what if" scenarios before you actually lay down any track.

Model-train engineers can even create tracks with curves and switches, using metric or foot/inch measurements (in decimal notation). The program also features a library of 200 curve arcs customized to standard train scales, such as Z, N, HO, S, O, and G, as well as bridges, scenery, overpasses, tunnels, and mountains. You can choose from more than six different area configurations with scales ranging from *one-thirty-second of an inch = 1 foot* to *1 inch = 1 foot*. When I used the HO gauge and the scale *one-eighth inch = 1 foot* to print the sample file, the layout measured 31 by 17 feet.

Pull-down menus make layout design and construction easy, and there's a special tool that automatically places dimension lines (lines with arrows at each end and a measurement in the center) where you specify. Cut, copy, and move functions erase or replicate selected portions of the screen. Text tools let you enter small or large horizontal and vertical type on screen to label buildings, specify industrial sites, or define geographical

elements. You can draw arcs freehand with the sketch option; other drawing tools let you put personalized illustrations on cars.

Destinations such as a slaughterhouse, a perfume factory, a logging mill, or a recycling plant complete your layout. Then you can select up to 16 cars from a rolling-stock library that includes passenger coaches, sleeping cars, hoppers, freight cars, early or late steam locomotives, diesel locomotives, and cabooses. Freight can include automobiles, beer, canned goods, chemicals, textiles, wood chips, or any of 26 other choices. Define your cargo, hitch cars together, blow the whistle, and chug that choo-choo.

While the train is running, you can couple, uncouple, switch cars, zoom in on a specific car for a close-up, keep track of all rolling stock on track, and lots more. The success of your railroad simulation depends in part on how you handle typical railroading tasks. This ability also helps the train reach its final destination on schedule.

Don't expect to become a whiz-bang train engineer overnight. Abracadata refers to Design Your Own Railroad as a "railroad simulation processor" — like a word processor, the program is a toolkit with endless potential, rather than an end in itself. Creating precision layouts that actually work takes patience and experience. Even the games require time to master.

#### MORE BITE THAN CHOO

This combination CAD-and-railroad-simulation package adds a new dimension to conventional model railroading, but it's far from perfect. If IIgs users want to read the small print used in switch settings, they'll have to set display to monochrome; to keep trains on track at fast speeds, they'll need to configure system speed to normal.

You can't install the program on your hard-disk drive, nor can you launch it from the GS/OS Finder because it uses a DOS 3.3-compatible operating system called *Diversi-DOS*, which GS/OS doesn't recognize. This incompatibility wouldn't be so annoying if disk operations weren't so cumbersome. Boot the flip side of a Design Your Own Railroad 5.25-inch program disk and a menu with three options (*Operations*, *Select Rolling Stock Graphics*, *Catalog Data Disk*) appears. If you choose the second item, *Select Rolling Stock Graphics*,

the program requests that you type a file name. If you don't remember it, you'll have to exit the option and select the third choice, *Catalog*. By today's user-friendly computing standards, this command-line interface is simply archaic.

While the software gives you an opportunity to generate hardcopies of pictures and train layouts, the printer-installation interface is awkward. To install a new printer, you must scroll through a list of 25 hardware options, remember the number that corresponds to your system's printer, then enter that number once the list has finished scrolling. You follow a similar installation procedure for the printer-interface card. Be sure to consult the chapter on printer installation in the manual, or you may end up configuring the printer settings incorrectly.

The CAD program offers pull-down menus, but minimal keyboard command equivalents. Selecting *Quit* from the *File* menu returns you to the mouse-configuration screen *Mouse or Paddles? (M/P)*, instead of truly exiting. *Precision Layout* designs have a flat, two-dimensional text-based appearance, instead of the 3-D look and feel you get with the *Operations* module. To save your *Precision Layout* designs and *Operations* layouts, you must have properly formatted data disks on hand; the software won't let you initialize disks within the program. Be sure to keep several formatted blank disks by your side, just in case.

The 200-page manual has no index for quick reference, and novices may find the instructions difficult to follow because there are relatively few screen dumps to illustrate instructions outlined in the text. The manual does include a delightful collection of historical pictures and drawings, though. Finally, there's no description of the icons that run down the right side of the *Operations* screen.

#### ALL ABOARD

Design Your Own Railroad combines the fun of model-railroad operation with the convenience of an electronic desktop. You can use it as a toy to re-create a favorite layout you had as a kid, take advantage of its powerful design tools to simulate "what if" scenarios for an actual transit system, or snatch a few moments

from your busy schedule to meet the challenges of its many games. Once you get used to its awkward interface, this software may be the only excuse you need to get back into "training."

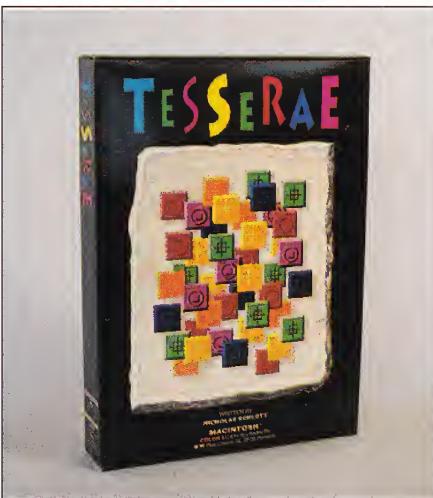
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## TESSERAE

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Tesserae: The perfect escape.

Arcade or strategy — is this the eternal question? Arcade-like action has a lot to offer. Fast-paced antics keep you on the move. Realistic sound effects and colorful animated graphics images make a game come alive. But some gamers tire quickly of the simple-minded "thrill and kill" genre, because the action is too repetitive. Games more concerned with beating the clock than with plotting battlefield strategies usually lose their appeal.

Enter Tesserae (from the Latin word meaning *cube*, or *die*). This single-player strategy game for the Macintosh has all the markings of good software entertainment. It features three levels of difficulty, nine mosaic (game-board) layouts, plus rich animated graphics images (even on black-and-white screens). In a standard game, players choose a board mosaic by clicking on its icon. In tournament mode,

Continued on p. 66



# The ELECTRONIC PALETTE

**With pixels as your medium and the mouse as your tool,  
Mac and GS paint programs help you discover the artist within.**

**By CYNTHIA E. FIELD, Ph.D. \* CONTRIBUTING EDITOR**

**L**et your visual imagination run wild — a good paint program and a graphics-smart computer like the Apple IIgs or the Mac LC can put the fun back into creating. How? Besides providing electronic versions of traditional art tools such as the sketchpad, the palette, and the brush (and a host of unique tools, as well), paint programs offer one extraordinary feature, unlike anything you can buy in a graphics-supply store: a host of editing, save, and undo options that let you alter any part of your image, at any stage, neatly, simply, and easily. Just as your word processor can help you overcome writer's block, a paint program helps you conquer your fear of "the empty canvas."

#### **ARTIST'S CHOICE**

Let's take a look at five popular low-cost art programs: **Amazing Paint**, **Color MacCheese**, **Easy Color Paint**, **MacPaint**, and **Platinum Paint**. (See the accompanying sidebar, "For Kids — and Kids at Heart," for a rundown on three children's packages for the GS and the Mac.) Although each product is unique in certain respects (see the accompanying "Portraits in Miniature" for details), most Mac and GS paint programs have much in common. For one thing, they all exhibit Apple's "Human Interface" standard, with easy-to-use pull-down menus, dialog boxes, and mouse input (with more-

or-less standardized alternate keyboard commands for the power artists among you).

Each program offers a well-stocked toolkit, with both traditional and New Age paint options packaged in a movable palette. (For example, MacPaint, for 512K Macintoshes, lets you "tear off" the tool palette from the menu bar much as you would a piece of notepaper from a pad. Drag the palette to the screen location you like best and, when it's time to admire a completed painting, click on the tool window's close box to prevent the palette from obstructing your view.) Each tool palette sports icons symbolizing the art supplies you need to create an unlimited variety of images — anything from landscape paintings to flow charts to school insignias, company logos, and hi-tech doodles.

A choice of a dozen or more brush shapes isn't uncommon, and with a full-featured program such as Platinum Paint (1-megabyte GSes) you can even create custom brushes from virtually anything you design, including digitized or scanned images you've imported. "Brushifying" is a lot like rubber-stamping, or placing stickers on a piece of paper.

For precise detailing, your paint program's pencil tool and zoom feature are unparalleled. Some products, Easy Color Paint (1-megabyte Macs) among them, add a magnifying-glass icon to the tool chest, while



An outstanding collection of features, including predefined color palettes, a 70-item pattern palette, and a bonus "Hi-Tech Coloring Book," makes Creative Software's Easy Color Paint for the Mac an exceptional bargain. Painting above by Randy Marks.

other programs, including Color Mac-Cheese (1-megabyte Macs), display magnification buttons such as "2X," which doubles the size of selected areas of your work. Amazing Paint (512K Macs), offering both a magnifying-glass icon and boxed symbols, can enlarge your image some 800 percent.

#### SHAPING UP

In addition to intuitive tools such as brushes, pencils, and magnifying glasses, paint programs also offer tools that automatically create hollow or filled, framed or borderless geometric primitives. Simply click on the round-rectangle icon, for instance, and "rubber-band" the shape by pressing the mouse button while you drag.

Creating custom polygons as well as arcs and lines (a half-dozen line thicknesses are usually offered) is also as easy as selecting the appropriate icon from the tool palette. Use the shift key whenever you want to constrain a shape: The oval tool will construct a near-perfect circle, the rectangle tool a near-perfect square, and so on.

All paint programs offer at least two colors — black and white — and a series of patterns, as well. MacPaint and Amazing Paint are purely black-and-white programs, but are nevertheless ideal for designing many kinds of graphics — from a mock-up of a commercial advertisement to a deco-

rative "pen-and-ink" sketch for your 1991 holiday greeting card. Using the assortment of gray-scale patterns provided with these programs widens your creative options further. Incorporate some stylized text — all programs support standard Mac or GS fonts — to complete your project.

#### ELECTRONIC CRAYONS

True to their names, most paint programs offer more colors than a box of Crayolas. Multicolored patterns are standard with these products, as well, and virtually all let you create custom color patterns if you like.

Generally speaking, each paint palette displays 16 colors at a time from a cast of thousands. Programs like Platinum Paint let you create 16-color custom palettes from the 4096 hues generated by GS systems. Easy Color Paint's 256-color Mac palette will spoil you, though. With additional memory on the Mac LC, you can sample Color MacCheese's 32-bit graphics palette and "millions" of colors, but you might just be contented with the countless options offered by the program's color wheel.

In the GS/Mac art world, paint is never in short supply, and applying it is never a problem, either. Besides a multitude of brushes, try the paint-can and airbrush tools to add pizzazz to your creations. The paint can fills a designated area with a

specific pattern, color, or gradient. The airbrush (which looks like a can of spray paint) spews and splatters paint on your canvas according to the nozzle size and spray rate you choose.

Picking colors from the paint palette is a snap — just click to "dip" your brush or other paint tool on the desired color swatch. Paint palettes, like their tool-palette counterparts, often take the form of windows you can move around the screen. Sometimes paint palettes are pull-downs or pop-ups instead.

Replicating a color you used previously in a painting is easy if your paint program offers an eye-dropper tool; click it on the section of canvas displaying the color you want to use. It's a lot easier than using a paint palette — particularly when the palette's composed of hundreds of colors.

Besides letting you store your creations in standard formats on a data disk, color programs such as Easy Color Paint let you make hardcopies of your paintings on a color-capable printer like Apple's ImageWriter II. The washed-out quality of printed paintings doesn't compare to their original screen appearance, though, so you might want to consider other ways of showing off your work. Two possibilities come to mind: recording your art gallery on videotape directly from the computer screen or incorporating your creations into hypermedia stacks.

Sometimes the canvas size you choose is larger than the monitor's screen. Moving around an outsized painting like that is pretty easy, thanks to scroll bars or the "grabber" tool (which looks like a pudgy human hand). Most programs elicit automatic scrolling when the tool you're using "bumps" into the paint window's boundaries.

Within memory limits, programs such as MacPaint let you work on as many as nine paintings at one time. Switching from one window to another — for comparison purposes or just for diversion — is as easy as pulling down the *Goodies* menu and selecting the artwork you want to view.

#### FINISHING TOUCHES

Editing a traditional painting is at best an untidy proposition. Unless you enjoy piling on paint and scraping it off, art in the "real world" is pretty much a done

deal. (Try fixing up a painting that's partially or completely dry and you'll see what we mean.) With a computer paint program, easy-to-use editing tools abound. And you can invoke them today, next week, or next year.

Let's say you've painted an avocado on the right-hand side of a still life and then decided the fruit would look better on the left. In the real world, you're out of luck unless viewers plan to admire a reflection of your masterpiece in a mirror. It's no problem with digital artwork, though. Begin by selecting the avocado with either the *marquée* or the *lasso* tool. The marquée picks up rectangular areas, while the lasso shrink-wraps oddly shaped selections.

Notice how we've avoided the word "object" in describing the avocado in our hypothetical still life? In "computerese" an *object* is a graphics element that's created with a drawing program. Objects differ substantially from *bit-mapped* designs created with paint programs like the ones we're talking about here.

Objects are like modular pieces of a drawing, which your Apple constructs from mathematical formulas. You can click on an object, pick it up, and move it around. Significantly, you can layer objects without erasing any objects that lie underneath. Not so with painted creations. They're plotted within a grid of picture elements (*pixels*) arranged in a single layer on your computer screen. Paint a purple pixel green and that purple pixel is history.

While there are probably as many ways to rearrange parts of your bit-mapped still life as there are artistic styles, the easiest may be to select the avocado with your program's lasso and drag the fruit to its new destination. This action, however, leaves a white splotch on the canvas where the fruit appeared originally. If the still life's background is simple, you can use the paint-can tool to fill in color. If the backdrop's somewhat more elaborate, however, you'll want to employ special features, such as Platinum Paint's shading, blending, and smoothing options, as well.

Virtually all paint programs have the ability to flip, stretch, and shrink selections. In addition, while most programs restrict rotation to 90-degree increments, Amazing Paint lets you rotate selections freely. Marquée the avocado, pull down the *Effects* menu, and choose *Free Rotate*. Tug the corner handles appearing on the selection's frame until you get just the effect you want.

With paint programs like the ones featured here, even your failed attempts won't clutter up your studio. Whenever you want, you can start fresh with a new canvas: Clear the screen or open a new document. You can fix minor bloopers with the indispensable *Undo* command or the eraser tool. If you're working in MacPaint, use the program's *Snapshot* option for bigger blunders, or "revert" to the previously saved version of your masterpiece-in-progress.

Whether you're searching for a new recreational pursuit, a hi-tech medium in which to develop your professional talents, or new inspiration for your fine-arts class, take time to explore the world of computer painting. With a boost from a low-cost graphics package, your GS or Mac can transcend the world of mere productivity to become a vehicle for creativity, as well. A paint program can give you back the freedom to play.



Concert flier created with CE Software's Amazing Paint for the Mac. It's black-and-white only, yet offers a substantial number of tools and effects, including free rotation and 36 built-in shapes.

## PORTRAITS IN MINIATURE

### AMAZING PAINT 1.01

Despite its exclusively black-and-white graphics capability, CE Software's Amazing Paint is a surprisingly full-featured Mac graphics program.

Among the software's noteworthy attractions is a dynamic three-column "equipment palette." The first two columns comprise the "tools panel," featuring customary implements such as the paintbrush, pencil, hand, paint can, magnifier, airbrush, and assorted geometric shapes.

In addition to a marquée and a lasso, Amazing Paint also provides two special selection tools: a shape selector for demarcating an area with one of the program's 36 built-in shapes (or a shape created on the fly) and a unique "wand" for capturing interior spaces within enclosed areas.

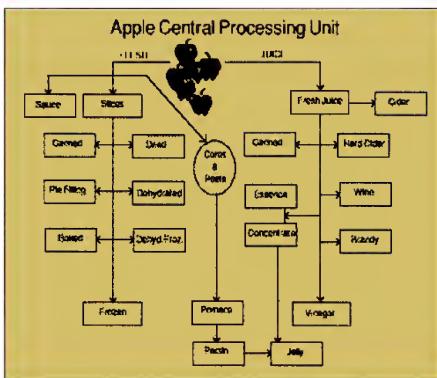
The third column in the equipment palette represents the "action panel," which changes to reflect options available for a selected tool. When you click on the spray can, for instance, the program's action panel lets you choose among dozens of patterns, shapes, and speeds as well as opaque, transparent, inverted, and "eraser" inks.

Here's an extra benefit: Amazing Paint's tidy action panel makes the program screen one of the least cluttered we've seen. For maximum convenience, everything's available at the click of a mouse.

The program's unique multiple-undo capability lets you back up — not just one step, but two, three, or more; magnification buttons enlarge your work 2X, 4X, or 8X, or even reduce it to one-half or one-third.

If your Mac has sufficient memory, you can work with as many as eight paintings at a time. A singular "billboard mode" printing feature lets you create large multipage posters, with or without crop marks for ease of assembly.

Among other "amazing" features are the program's automatic, customizable arrowheads on lines; three dozen eraser shapes for ease of editing; user-defined corners on round rectangles; and a generously illustrated, spiral-bound



**Flow charts are a snap with Baseline's Color MacCheese for the Mac, thanks to a coordinates window for precision projects.**

manual that's less than a quarter-inch thick and quite a pleasure to read.

## COLOR MACCHEESE 2.0.5

Without question the most colorful paint program evaluated here, Baseline Publishing's Color MacCheese for the Macintosh (reviewed in July 1991, p. 30) may well be the most memory intensive, as well—if you plan to exploit all its features, that is. As the program's sometimes flippancy, sometimes entertaining (but sometimes sketchy) manual asserts, "A minimum of 2 megabytes is recommended and more is better."

The reason? Color MacCheese supports true 32-bit graphics with millions of possible color choices. Fortunately for the rest of us, Color MacCheese also helps you set preferences for color choice,

canvas size, and screen display based on the amount of random-access memory available in your Macintosh.

The program's flotilla of "floating windows" includes a tools area with its cache of ordinary items, such as brushes and a pencil, and extraordinary ones such as an eyedropper, a rake tool, a water-drop tool, and a transmogrifier.

The context-sensitive help window is a MacCheese exclusive. Move the mouse over a tool or other screen item and the window provides pertinent information. Point to the transmogrifier, for instance, and the help window tells you that this tool adds texture, and suggests double-clicking on it to set size and flow.

## FOR KIDS — AND KIDS AT HEART

Before you let your kids share in the fun, reawaken the child inside yourself with **Color 'n' Canvas**, a top-notch GS paint program for elementary-school children published by Wings for Learning, an affiliate of Sunburst Communications; **My Paint**, a "no words" GS package for kids aged 4 to 8, from Saddleback Graphics; and **Kid Pix**, a wildly entertaining new paint program for the Mac from Broderbund Software. Color 'n' Canvas and Kid Pix let you print masterpieces in color on an ImageWriter II; you'll get wonderful refrigerator art in color with My Paint, too, but you'll have to print it via another GS paint program.

### COLOR YOUR WORLD

Designed primarily for schools, Color 'n' Canvas (reviewed in January 1991, p. 86) features seven easy-to-understand pull-down menus, a tools bar with items such as brushes, geometric shapes, a paint can, a text tool, an eraser, a cut-and-paste (or marquée) tool, a hand tool, a magnification tool, and a prominent undo button. Although there's no airbrush tool, you can easily create a custom brush to simulate a spray can. Some unexpectedly advanced features include a choice of grid settings (or no grid) and nine possible brush

mirrors. Grids are composed of invisible, magnetic lines that help you align your work. Mirrors let you draw brush strokes that radiate simultaneously in various directions.

To make things easier for young artists, Color 'n' Canvas uses nonstandard mouse movements. In other programs, drawing a line means holding down the mouse button while dragging the mouse from the line's origin to its terminus and then releasing the button. With Color 'n' Canvas, you click to begin the line and click when it's finished. Instead of "rubberbanding," you click-drag-click.

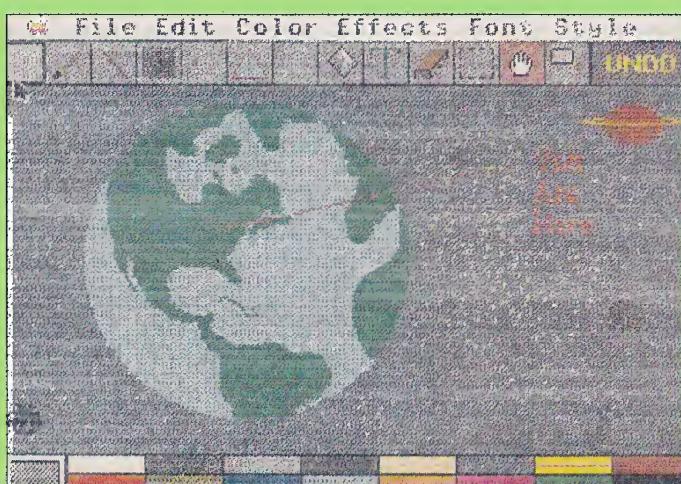
A color bar at the bottom of the screen provides 16 hues, based on a default palette derived from the traditional RYB (red/yellow/blue) color wheel. Teachers can opt to use the RGB (red/green/blue) color editor instead. A unique Color 'n' Canvas feature lets the teacher design temporary or permanent backgrounds on which children build their paintings. Another unique feature is the program's ability to format data disks.

Color 'n' Canvas includes an assortment of options for teachers, such as disabling the program's brush-editing feature. Like all Sunburst products, Color 'n' Canvas comes with a host of lesson ideas and reproducible classroom worksheets.

### ELECTRONIC FINGERPAINTING

My Paint features animated icons, musical colors, flashing paints, and talking pictures. Youngsters can draw and paint their own, or brighten up one of 28 black-line graphics included on disk. There are 10 colors from which to choose, each with its own associated sound. If you point-and-click on the colors in just the right order, you can even play a simple tune, such as *Twinkle, Twinkle, Little Star*.

There are no words to read or keyboard commands to enter. Kids simply point-and-click on animated icons in a menu bar at the top of the screen. The eight paint-tool icons include two freehand brushes (one thick, one thin), each painting in a hue selected from the 10-color palette running down the right side of the screen. A third tool works in tandem with either brush to paint freehand strokes in a series of six colors (orange, yellow, green, blue, pink, and red).



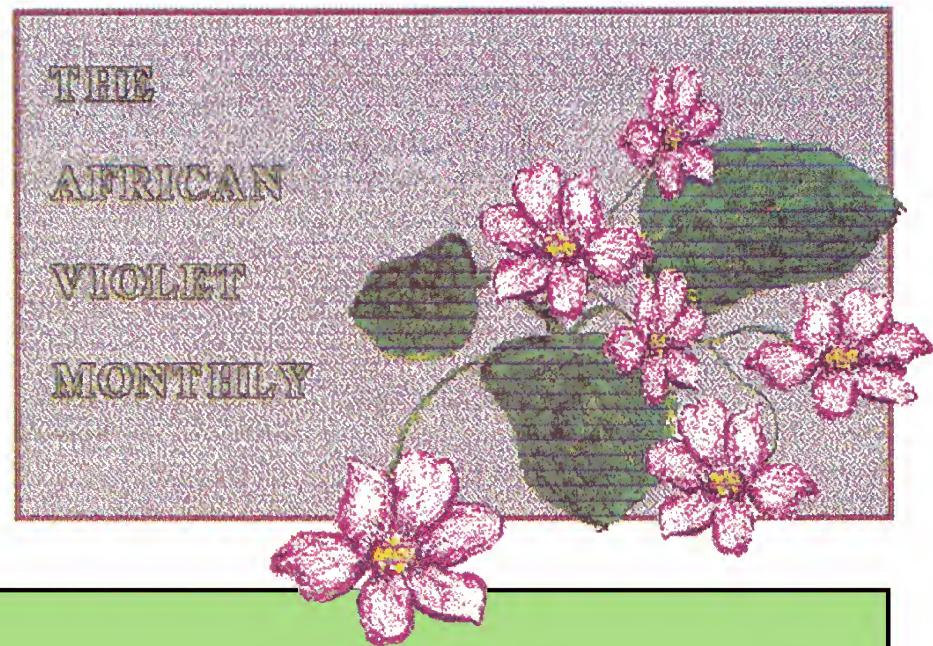
**Screen dump: Wings for Learning's Color 'n' Canvas for the GS offers plenty of advanced features in an easy interface.**

For precision paint jobs, a special window displays x,y coordinates, indicating the actual location of the mouse with respect to the origin (the upper left-hand corner of the document), and delta coordinates, representing the distance you've dragged the mouse.

Most Mac LC artists will want to display the program's 24-color handy palette as well as the gorgeous color wheel with countless more possibilities.

Scroll to the end of the patterns palette to view the program's rich assortment of black-and-white and multicolor designs — and its digitized images of famous

**Magazine logo in Easy Color Paint for the Mac, dithered for ImageWriter II.**



My Paint's arsenal is limited compared with the array you'll find in Color 'n' Canvas, yet it still gives children the chance to experiment with colors and special effects. Clicking on the mirror icon, for example, directs the program to replicate a paint stroke both horizontally and vertically. When the mirror's "on," the brush paints four images instead of one. The program's "fill-'em-up" icon is another useful special-effects tool. It encourages kids to draw an outline, then fill it with color. The outlined area must be completely enclosed or bordered by other areas of color for fill-'em-up to work; if there are any gaps in the border surrounding the outline, fill-'em-up will spill paint beyond the outline's boundary.

Clicking on the menu bar's flashing-colors icon activates the program's most interesting special-effects tool. When this one's "on," images painted in the drawing window change hues rapidly, like color cycling. Elements painted with the color brush take on a neon-sign quality as they simulate a rippling movement.

Click on the disk icon and you'll see a new menu with big blue and red arrows. Every mouse click on an arrow calls up another of the program's 28 line-art drawings. When youngsters see a picture they want to color, they just click on it to select it, and the color palette reappears.

Each drawing has an associated audio effect, as well: Click on the mouth icon and the brontosaurus growls, the kitty meows, the duck quacks, and so on.

My Paint succeeds because it's not just an ordinary paint package. Its innovative approach to electronic painting shines through from the moment the program first appears on screen. Animated icons, flashing colors, digitized speech, and a user-friendly interface combine to make the product both easy to use and lots of fun. "It's totally awesome, dude!" exclaimed my 7-year-old helper. I couldn't agree with her more.

#### **NOT FOR KIDS ONLY**

Kid Pix is a blast! Sure, it offers honest-to-goodness paint tools such as assorted brushes, familiar geometric shapes,

and a 36-color paint palette. Some tools — the paint bucket, for one — look like standard adult fare. But others, such as the stubby pencil and the moving-van marquée, win thumbs-up for cuteness. Throw in a couple of "unique" paint tools, such as the electric mixer and rubber stamps, and you get the picture: Kid Pix is a pure delight!

So delightful, in fact, that the program's paint tools make sounds — and sometimes they even talk. Click on the undo guy, and, if he's not making boinking sounds, he's blurting out an "Oops" or an "Oh, no!" Listen to paint gurgle or hear the letters of the alphabet sounded out by real folks speaking English or Spanish. Try clicking on the text tool and "playing" some letters, numbers, and selected punctuation marks just as you would musical notes on a piano keyboard.

Kid Pix's wacky brushes are well named. Try the bubbly-brush option: It looks and sounds like bubbles you blow in the bathtub (okay — bubbles you used to blow in the bathtub). The galaxy brush option plinks down a random assortment of stars, while the alphabet line sounds like a manual typewriter. There's even a crazy connect-the-dots brush to help you design custom dot-to-dot pictures.

Kid Pix can import other Macintosh files, including clip art, digitized photos, and Print Shop graphics as well as pictures created with some of the adult paint programs reviewed in the accompanying article. Kids will relish livening up your artwork with Kid Pix stickers and funny brushes. If you have a Mac LC or IIci (or a Macintosh equipped with the **MacRecorder** digitizer card-plus-software sound system from Farallon Computing), you can even incorporate real-time sounds into your paint files. As we said in our June 1991 issue (Editors' Choice, p. 80), Kid Pix is "the best paint program you've ever heard."

— Cynthia E. Field and Carol S. Holzberg



**Broderbund's Kid Pix for the Mac: the best paint program you've ever heard.**

personalities. If you've been wondering where "The King" will appear next, we've got the answer — he's been immortalized in the Color MacCheese pattern window!

### EASY COLOR PAINT 2.0

If you're looking for an economically priced, one-size-fits-all paint program for the Macintosh at home or at school, look no further than Creative Software's Easy Color Paint. The software comes with four ready-made preference files (*Intro*, *Junior*, *Standard*, and *Artist*) and a series of user-selectable options to help you configure the software to suit your needs. You can experiment freely with virtually all settings without restarting your Mac.

For example, the *Artist* level paint palette displays dozens of colors at one time, but the paint chips are so tiny that it might be difficult for very small children or visually impaired adults to select colors or to discern subtle differences among them. Paint swatches in the 256-color *Standard* palette are larger, and those in the 16-color palettes are the largest of all.

Children will enjoy the program's accompanying *Hi-Tech Coloring Book*, which contains dozens of ready-to-fill pictures on disk. We can't think of a better way for elementary-school kids to earn computer "bragging rights" than to embellish one of these drawings and print it on an ImageWriter II.

When you're ready to create original artwork, Easy Color Paint provides the tools you need. When you click on certain



Easy Color Paint offers selectable options for individual configuration. Electronic "sampler" above by Kjersti Ehrie.

items in the program's *Tools* pull-down menu or the skinny-tools palette, the program's menu bar changes accordingly. For example, clicking on the eraser creates a special menu you pull down to alter that tool's size.

More than a dozen predefined color palettes and various gradient fill modes are available in Easy Color Paint. There's also a "triangle-plus" tool for drawing special geometric shapes such as crosses, diamonds, and wedges.

In addition, the program's pull-down pattern palette provides more than 70 ready-made black-and-white and multi-color patterns. Like some of its pricier competitors, Easy Color Paint even lets you choose degree of roundness on the corners of round rectangles.

Easy Color Paint lacks a few of the usual popular features — free rotation, for one — and the program's spelling of *marquée* (*m-a-r-k-e-e*) is a little disconcerting. Despite these minor gripes, though, Easy Color Paint offers a stable of features we consider outstanding for a program costing so little.

### MACPAINT 2.0

Although it displays in black-and-white only, Claris Corporation's MacPaint program is a respected standard bearer among software products for Apple computers. The program supports up to nine movable, resizable document windows.

Myriad tool options include, among other things, multiple brush sizes and shapes, a ready-made (but editable) pattern palette, assorted type styles, and special alignment controls, including both text justification and line leading.

Unlike most commercial paint programs in its class, MacPaint sports a mouse-position window displaying not only *x*, *y*, and delta coordinates, but also distance in inches, centimeters, or pixels.

In addition to the usual undo and revert-to-saved features, MacPaint offers a unique *Take Snapshot* command that lets you save a backup copy of your painting in the computer's memory. If you make a series of changes you'd later like to discard, recall the snapshot by choosing *Revert to Snapshot* from the *Edit* pull-down menu.

Another MacPaint-specific feature is the program's ability to save files as "stationery templates." The MacPaint user's guide compares stationery files to pads of preprinted forms. Each template contains text and artwork you use frequently and opens as an untitled document — a safety valve that precludes the likelihood of erasing the original template on your data disk.

MacPaint may lack advanced features such as custom brush shapes, editable spray-can nozzles, and free rotation, but

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Claris' black-and-white MacPaint offers a solid array of tool options and type styles, plus the ability to save frequently used text and art as template files.

the program offers most of the capabilities you're likely to need.

Combine a crisp interface, pull-down (or pop-up) tool and pattern palettes, a host of tried-and-true paint features, and well-designed documentation (80 clearly written pages), and you've got a combination that's hard to beat.

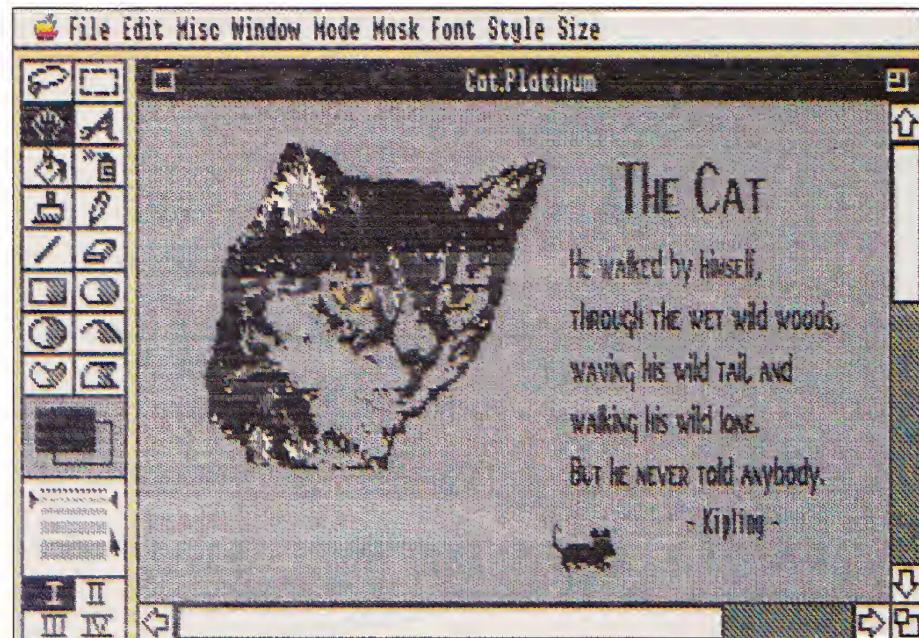
### PLATINUM PAINT 1.01

If the Apple of your eye is a IIgs, run, don't walk, to your favorite software vendor and get your hands on a copy of Platinum Paint, a Beagle Bros product we admire absolutely unabashedly (*Editors' Choice*, January 1991, p. 112, reviewed in April 1991, p. 32). Truth be told, if we were forced to prepare a head-to-head feature comparison between this GS program and the Macintosh products we've described in this article, Platinum Paint could beat the competition to a juicy red pulp.

Like its Mac counterparts, Platinum Paint supports multiple document windows and offers a selection of standard painting tools, such as the marquée, the lasso, the airbrush, and the polygon. You can even use analogous Mac keyboard commands to open and save files or to constrain shapes or tool actions. The program's paint bucket performs gorgeous gradient fills, and its dropper lets you switch paint color as fast as you can say "Macintosh."

But Platinum Paint offers a whole lot more. For one thing, the program sports the longest list of editing features we've seen. Not only can you flip a selection both horizontally and vertically, you can mirror it, halve it, double it, stretch it, slant it, freely rotate it, add perspective to it, and cast a shadow beneath it. Don't worry about getting carried away with all these changes: You can mask colors or selected areas so that you don't alter them.

As you might expect, learning Platinum Paint's countless nuances presumes spending some time with the program's documentation, a 124-page manual that's nicely illustrated and written with both clarity and style. The abundance of sample files that accompany the program can help you become familiar with some of Platinum Paint's outstanding capabilities. We particularly enjoyed the program's



Screen dump from Beagle Bros' Platinum Paint for the GS. The program is compatible with a sizable range of Apple II graphics formats, and offers a unique selection of image-editing capabilities and brush effects.

short tutorial lessons on squishing custom brushes, colorizing gray-scale images, and animating artwork through color cycling.

Best of all, this one gives you room to grow: The ability to import a wide variety of Apple II graphics (including Print Shop and Print Shop GS formats) and a choice of normal, matte, smear, slide, charcoal,

shade, wash, and smooth brush methods mean you won't have to worry about outgrowing Platinum Paint anytime soon. □

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### PRODUCT INFORMATION

#### Amazing Paint 1.01

CE Software  
P.O. Box 65580  
West Des Moines,  
IA 50265  
(515) 224-1995  
\$99.95  
512K Macintosh

#### Color MacCheese 2.0.5

Baseline Publishing  
1770 Moriah Woods Blvd.  
Suite 14  
Memphis, TN 38117  
(901) 682-9676  
\$99.95  
1MB Macintosh,  
System 6.0.4 or later,  
color QuickDraw in ROM

#### Color 'n' Canvas

Wings for Learning  
1600 Green Hills Road  
Scotts Valley, CA 95067  
(408) 438-5502  
\$99  
1MB Apple IIgs

#### Easy Color Paint 2.0

Creative Software  
3213 Annandale Road

Durham, NC 27705  
(919) 493-9503

\$89  
1MB Macintosh,  
System 6.0.2 or later

#### Kid Pix 1.0

Broderbund Software  
17 Paul Drive  
San Rafael, CA  
94903-2101  
(415) 492-3200  
\$49.95 home edition  
\$59.95 school edition  
\$119.95 lab pack  
1MB Macintosh,  
2MB for color monitor,  
hard disk or two 800K,  
System 6.0 or later,  
System 6.07  
and Farallon MacRecorder  
for sound recording

#### MacPaint 2.0

Claris Corp.  
5201 Patrick Henry Drive  
Box 58168  
Santa Clara, CA  
95052-8168  
(408) 987-7000  
\$125

512K Macintosh,  
hard drive or two 800K,  
System 6.0.2 or later

#### MacRecorder

Farallon Computing  
2000 Powell St.  
Suite 600  
Emeryville, CA 94608  
(415) 596-9000  
\$249  
Mac Plus or later

#### My Paint

Saddleback Graphics  
12812 Garden Grove Blvd.  
Unit P  
Garden Grove, CA 92643  
(714) 741-7093  
\$49.95  
512K Apple IIgs

#### Platinum Paint 1.01

Beagle Bros  
6215 Ferris Square  
Suite 100  
San Diego, CA 92121  
(619) 452-5500  
\$99.95  
1MB Apple IIgs

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# COMMAND PERFORMANCE

**For teaching, recital, and composition, in classrooms, concert halls, and studios, Apple IIs and Macs deliver a powerful sound.**

**By GREGG KEIZER \* CONTRIBUTING EDITOR**

If the closest you come to making music is whining along with Neil Young on your car radio or dancing in your briefs to an MTV riff, you're not alone. Millions of us can't carry a tune to save our lives.

Fortunately, millions can — millions of machines, that is. Apple computers — from the sedate IIe to the boisterous IIgs to the professional Macintosh — can sing like a Baptist choir, swing from country to rock as quick as the Kentucky Headhunters, and soar in symphonic power like the Boston Pops. If you want to make music but can't read a note, an Apple II or a Mac will let you jam along. If you teach music, the computer is an infinitely patient one-on-one instructor. And if you're a professional musician — a performer or composer — a computer/synthesizer combination puts a whole orchestra and sound studio on your desktop.

Still think computers and the fine arts don't mix? Think again — and listen to what music lovers are doing with IIs, GSes, and Macs as their instruments. The pros — musicians and teachers — have blazed this new technological path, but even those of us who thought we could only warble along get to reap the notes they've sown.

## SILICON VALLEY SINGS

Long before the term *MIDI* (*musical-instrument digital interface* — see our accompanying story, "The MIDI

Beat," on p. 44 in this issue for details) meant anything to the rest of us, San José Academy was connecting Apple IIe computers with Casio keyboards in an innovative teaching laboratory.

A magnet school that attracts 16 different minority groups to its fine-arts and technology-based curriculum, San José Academy sports one of the most impressive electronic-music programs in the country. Dr. Hal Peterson, head of the fine-arts department, runs the MIDI lab as well.

"I'm teaching music through technology," says Peterson, as he looks out over the lab's 24 Apple IIs, banked in two rows and spread out on both sides of his command center. "We do most of our instruction through computers rather than through traditional means."

That's easy to see when you take a walk through Peterson's lab. Each student workstation features an Apple IIe, a Casio CZ-1 synthesizer, a Passport MIDI interface, and a color monitor. Connected via a Corvus Omninet network to a 126-megabyte file server, the workstations are also linked to five ImageWriter II printers.

At the front of the room, Peterson's teaching center includes a similarly equipped IIe, as well as a spaceship-style panel that controls the lab. A compact-disc

## MUSIC-EDUCATION PRODUCTS

player, a laser-disc player, and a video-cassette recorder let him pump music over speakers or display video on every monitor.

Because much of Peterson's program originates as software-based instruction, the network is vital, letting students progress at their own speed as they learn basic keyboard technique, musical notation, electronic sound creation and editing, sound sampling, and more. Peterson lobbied software publishers to make their packages work on the network; the result is a collection of site licenses for more than 40 programs.

A lab session may see Peterson at his command center, playing a sequence on his Roland synthesizer over his students' earphones. He may put on a laser disc highlighting several composers of classical music. Kids may walk themselves through a self-paced lesson on digital sampling, or work on their own musical projects.

The technology doesn't work without some sweat, though. Setting up the network was a minor nightmare; keeping it up and running is almost a full-time job. And though the Apple IIe was the right choice when the lab was built, Peterson looks forward to the day when he can integrate more powerful machines into the lab. "I need high-end workstations for the advanced students," he explains. "The Macintosh is the machine of the music industry. And there are certain things that the PC can do," particularly with the more sophisticated music-editing and notation software commercially available in the MS-DOS marketplace.

But Peterson says he won't give up his Apple IIe stations. "The kids don't want to just read things — they want you to show them," he observes. Peterson does just that, playing student projects over huge speakers or putting scrolling scores on the students' monitors. "It's a powerful way to present ideas, and music," he notes.

"The computer is like a textbook," says Garrick Wahlstrand, one of Peterson's charges, "but you don't have to carry a textbook around." Adds Kiki Walker, another student, "The computer lets you work at your own speed. You can arrange a piece of music one instrument at a time, in small pieces."

The technology isn't cheap — the computer parts of the lab carry a price tag of

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well over \$100,000 — but Peterson sees a more pressing limitation: "The reason you don't see more classes like this is a matter of training. The kids aren't threatened by this, but many music teachers are."

## MUSIC ON THE MOUNTAIN

High atop a ridge overlooking Hartford, Connecticut, on the former site of an anti-aircraft missile battery, kids play Apple IIcs computers like so many musical instruments.

The Talcott Mountain Science Center gives children a glimpse of the future. With 22 telescopes, a Doppler weather radar system, a national satellite network, and a range of other high-tech hardware items, the school spreads hands-on learning among children in the Hartford area, throughout New England, and across the country. Donald La Salle, Talcott's director,

calls it an attempt to "give kids technology and literally turn them loose."

Children come from neighboring towns for day-long and weekend instruction, while 60 exceptionally gifted students attend the center's on-site day school. All get a crack at Talcott's many computers, including its Apple IIcses, which specialize in making music. Sixteen of them stock one of the center's two labs. With the exception of inexpensive headphones, the computers are off-the-rack, 1-megabyte machines.

"Music for the younger kids is strictly based on the Apple IIcs," says Greg La Salle, the center's music teacher. "All their training stems from learning to write music." And that's possible because of the machine's accessible, built-in graphics and sound capabilities.

"You don't have to add anything to the GS," La Salle explains. "For teaching, it's

more than adequate. Music used to mean learning theory first, and not being able to do anything with it. Now it's just the opposite. Kids get turned off because they can't play an instrument well, or at least for years. Now, with the GS, they can write their own music. And strangely enough, because they're writing it, it doesn't matter what it sounds like."

La Salle uses **Music Shapes**, from Music Systems for Learning, with the younger children — it's ideal for ear training, basic composition, and building instruments with the GS' 15-voice Ensoniq sound chip. From there, Activision's **Music Studio** takes over, and students begin to put notes on screen. Other GS software packages La Salle engages include **Instrument Designer** from Pygraphics' Pyware line — a great program for learning sound sampling — and **Music Writer** (also from Pygraphics), the best music-printing software available for the machine, according to La Salle. He boots up Electronic Arts' **Instant Music** to entice uninterested students into simply "mousing around."

"Eventually, they hook up MIDI keyboards," says La Salle. "Usually they'll MIDI up what they've done in Music Studio because they don't have to redo any of their work. In fact, all their work is saved from the fourth grade until the time they graduate." In effect, the Talcott Mountain plan means that students' music can grow as they grow as musicians.

The GS brings a slew of benefits to any music program, claims La Salle. Composition and performance are easy with the GS, he explains, so "kids retain a lot more, because they're using what they're learning. It quickly gets them to a level where they can use the things they've learned, and it gives them a chance to explore a variety of musical styles." Without a computer like the GS, adds La Salle, "you couldn't do orchestral arrangements with elementary-school kids; you couldn't print music."

"And they get to bring recordings of their work home," La Salle notes. "Kids bring home art to put up on the refrigerator, but what do they bring home from music class? How many parents sit and listen to their kids play the violin? With the computer, kids can create music, tape it, and bring home cassettes."

"It's a zillion times easier since we added

the GS," concludes La Salle. "Kids learn — and learn more thoroughly — with the IIgs computers."

### A JAZZ BEAT IN THE BIG EASY

New Orleans — home to Bourbon Street, Mardi Gras, and jazz — plays like no other city. So it comes as no surprise that the Orleans Parish School District features a school for the performing arts.

The New Orleans Center for Creative Arts (NOCCA) is a half-day high school specializing in music, theater, dance, writing, and the visual arts. Students attend their home high school for the academics, then hit NOCCA for intense instruction in their areas of interest. In music, NOCCA students focus on jazz instrumental, classical instrumental, or classical vocal study.

Stephen Dankner, the next chairman of NOCCA's music department, is a big believer in computers. A professional musician with some impressive credentials of his own, Dankner has overseen the school's "Computing in the Arts" program and was instrumental in bringing technology to NOCCA's music program.

The three dozen music students at NOCCA share a workstation that includes a Mac SE, three sophisticated synthesizers with a total capacity of 60-some voices, an effects processor, and sequencing and notation software. Though Dankner stresses traditional methods of composition — even as far as requiring students to score a piece in longhand first — he holds the Mac in high regard. "I couldn't conceive of anything else," he admits, adding that "students take to the Mac like a duck to water. It's an amazing machine. They don't need any outside help at all, and in fact can do high-caliber work in a very short time."

As a tool for composition and notation, the Mac SE, running Mark of the Unicorn's **Performer** and **Composer Notation** programs, is, in Dankner's words, "a new way to hold a pen. It's a visually based system of composition and performance that allows instant access to ideas, and lets you modify them for much quicker response time. The old days of trying things out and paying performers to let you hear what your work sounds like were much slower. [The computer] lets you try things out to make sure they're going to work."

The Mac puts a musical word processor

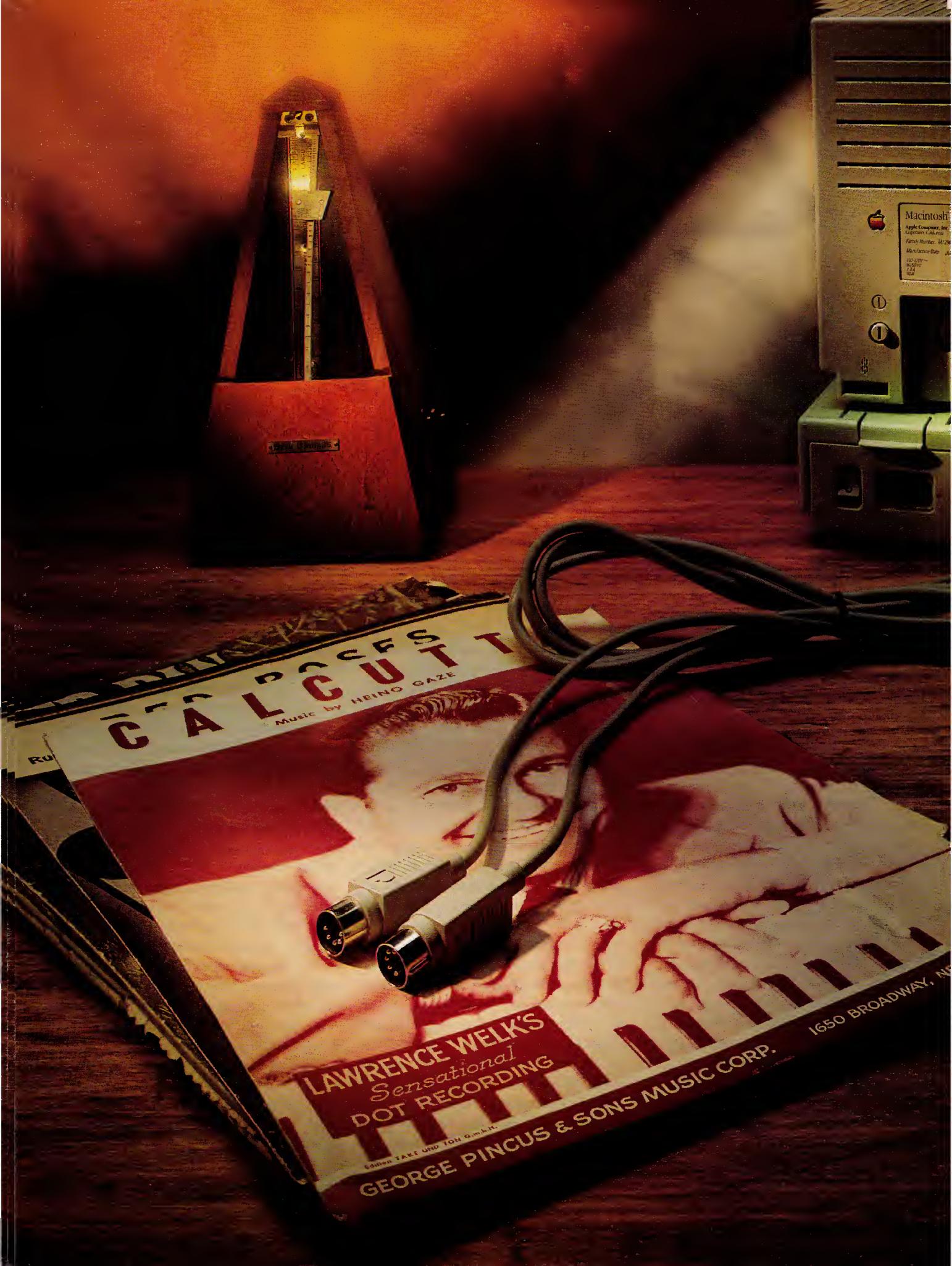
in the hands of his students, Dankner explains: "If you don't like something, you can cut and paste until it's perfect. It's revolutionary. If Bach had had this, he wouldn't have had to guess what he'd written. It makes my work more concise. I can always try out to make sure it's exactly what I want."

In his home studio, Dankner runs a Macintosh II, three hard-disk drives, three Kurzweil synthesizers, a mixer, and a full MIDI keyboard to compose and refine his own music. The setup provides an instant orchestra, letting him re-create music such as his recent piano and cello concertos without leaving home. "I can do a full orchestration on tape," he says. "I can give that tape to anybody, and they don't have to imagine what my music sounds like. They can hear it for themselves."

At the New Orleans Aquarium of the Americas, a new attraction alongside the Mississippi River, a Mac Plus connected to eight synthesizers plays four hours of Dankner's music as background in the Caribbean, Mississippi, and Gulf of Mexico exhibits. The seven-month project resulted in a score more than 500 pages long and music files of more than a megabyte. But Dankner says he doesn't feel that his home studio helped him write music faster, or be a more productive composer — it simply made him more creative. "The more you work with computers [in music] the more you realize they can't replace human beings," he says. "The soul and artistry of a good player just can't be replicated."

Even in music instruction, computers are no panacea to Dankner — but in their place as one in an array of tools for teaching, composition, and performance, they fill a niche that can support a curriculum in new ways. Balance is the key to getting the most from the machine. "I see the whole application as a veneer over the traditional way to teach music," Dankner states. "I believe strongly in that. You have to be able to hear and read music in the traditional ways. Integrating this layer just makes you a more powerful composer." □

CONTRIBUTING EDITOR GREGG KEIZER IS THE AUTHOR OF *BRIDGING THE GAP*, inCider/A+'S MONTHLY COLUMN ON APPLE II/MAC CONNECTIVITY. WRITE TO HIM AT 614 LINDEN STREET, SHREVEPORT, LA 71104. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.



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# The MIDI BEAT

**W**hat have M.C. Hammer, David Gilmour, and Steve Vai got that you haven't got? Talent? Well, sure, but you can't do anything about that. Money? Yeah, but they had to start at the bottom, just like you. What about their musical equipment? Chances are they're using *synthesizers* — electronic instruments that work together through *MIDI*, an acronym that stands for *musical-instrument digital interface*, the *lingua franca* of sound-generating chips.

MIDI was born in the early 1980s as a way for musicians to exchange information between synthesizers that weren't manufactured by the same company. At first it was of interest only to professional musicians, but as developers began to see that you could cable a personal computer to a synthesizer and control the instrument through the computer's software, MIDI rapidly turned into a marketplace buzzword.

Today, the MIDI standard is to the electronic-music business what SCSI (*small-computer-systems interface*) is to the home-computer industry. Whether you're a performing musician, a composer, or someone who just likes to tweak notes in your basement, you can plug into your Apple II or Macintosh with MIDI.

## TUNE IN

Even if MIDI didn't exist, you could still walk over to your electronic keyboard and play one of Bach's cantatas or *Chopsticks*, whichever's your speed, because

**How does one person  
play *A Bicycle Built  
for Two* in three-quarter  
time on four instruments?  
Through the magic of MIDI,  
of course. All together now . . .**

**By CAMERON CROTTY \***

**ASSOCIATE EDITOR**

all synthesizers have their own internal sound generators. With MIDI, you don't teach your synthesizer new sounds — you tell it when and how to play them. MIDI's purpose is to allow the transmission of performance data, such as when a note starts, its pitch, and when it ends.

Why use MIDI? Professional performers often hook up two or more synthesizers playing in sync to create a fatter sound with subtler harmonics. But when was the last time you played the Meadowlands to a sold-out crowd? MIDI gives amateur musicians new options, too. MIDI data is *digital*, which is where personal computers come in — you can connect your MIDI instrument via cable to an interface device and from there to your Apple, and, with the right software, record your performance on disk as you play your synthesizer.

You might tell your program to convert your music to a full conductor's score (or wave forms or other geometric symbols, in some cases) on screen; the software's

## GLOSSARY

**Aftertouch.** Pressure applied to a key after a note has been struck.

**Click track.** Audible clicks produced by your sequencer to keep you on the beat as you play.

**Foot switch.** Foot-operated switch, often used to control sustain.

**MIDI.** Musical-instrument digital interface. Established standard for transmitting data between electronic musical instruments, computers, and other devices.

**Patch.** Specific instrument sound from a synthesizer, used to play notes. Also called **voice**, and, more broadly, **timbre**. A maximum number of voices is programmed into synthesizer.

**Polyphonic synthesizer.** Capable of playing more than one note at a time.

**Polytimbral synthesizer.** Capable of playing more than one patch at a time.

**Punch in.** MIDI or tape-recorder feature allowing user to switch from playback to record at a preset location in a musical sequence.

**Quantization.** Computer-controlled correction for sloppy rhythmic play.

**Rack mount.** Components designed to fit into an audio rack.

**Sampler.** Plug-in sound-digitization card for computers, or stand-alone unit that records short sequences of (analog) voices, sounds, and music; converts them to digital data and stores them on disk for inclusion in synthesized music composition as desired. Accompanying software allows editing of sound data for speed, volume, fade, reverse, stutter, and so on.

**Sequencer.** Computer program that records on disk digital data representing music characteristics (not the music itself, as a tape recorder would) from synthesizer; allows music editing, such as deletion, transposition, adjustments to tempo and volume, and so on, and playback through synthesizer. Maximum number of tracks user can record and mix varies from program to program. Interface (controlled by mouse, arrow keys, keyboard overlay, or some combination) shows on-screen notes and staves, wave forms, colored boxes and lines, or other representation of music.

**Synthesizer.** Music-generating computer chip (such as GS' Ensoniq), plug-in card, or stand-alone electronic instrument (keyboard, wind, percussion, guitar most popular). MIDI instrument outputs music two ways: through its own speaker as analog sound heard by listener, and as digital data representing each note's characteristics (timbre, pitch, volume, and so on) according to MIDI standard.

**Step input/editing.** Notes recorded separately, edited one at a time, and strung together to produce musical sequence; as opposed to real-time input.

**Timbre.** Sound characteristics of a particular type of instrument (piano, flute, violin, and so on).

**Track.** Musical sequence recorded one (or a few) instruments (**voices**) at a time (not simultaneously); individual tracks combined to produce multi-instrument sound. Allows punching in for re-recording of one segment of music by one voice; allows editor to hear individual voices for clean editing and adjustment; allows one player to perform on all instruments by recording one instrument at a time, then mixing.

**Transcription software.** Program that lets user write musical notation on screen from computer keyboard; may also record notation on screen automatically as user plays synthesizer.

editing function will then let you cut and paste as you choose — something like word processing for music. (Many programs let you make a hardcopy, too, if your printer's hooked up.)

You can then tell your computer to send the new version back to your synthesizer, or to several MIDI devices at once if you like, and play it for you from the score you've just written. And because MIDI is an agreed-upon standard among computer manufacturers, you can also

transport your recording on disk between machines that use different operating systems, if the program you're using with the second computer contains a translator module.

We'll get into your software options later. First, let's turn on the bright lights and poke around in MIDI's innards.

### KNOCKING ON HEAVEN'S DOOR

The central component of any MIDI system is, of course, the synthesizer. If you

haven't purchased one yet, now is the time to consider the role you want it to play. Are you an accomplished pianist? Then you might want to consider a full keyboard with weighted keys and lots of pressure/velocity sensors to take advantage of your skill. Foot switches and pedals let you manipulate volume and sustain on the fly.

For the pianist with the soul of a clarinet player, some synthesizers offer input through a breath controller, which lets you play notes on your keyboard while you blow into a small device that translates airflow into attack, sustain, and volume.

If you play a wind instrument for real, you might want to consider an input device that looks and plays much like, say, a saxophone. Guitar controllers are also common among MIDI musicians.

The abilities and limitations of your synthesizer's microprocessor — the selection of *timbres* (different instrument sounds, or *voices*) programmed into it and the complexity of the music they produce — should be another important factor in your decision. Most synthesizers currently on the market are *polyphonic* — they can sound more than one note at a time. Some are limited to four notes at once, while others can play eight or 16.

But although most synthesizers can mimic a number of different instruments, only a few can play more than one of their instrument sounds at the same time, such as flute and trombone together. Those that can are called *polytimbral* and are usually more expensive, but they'll save you the cost and trouble of setting up several synthesizers when you want to play multi-instrument scores.

### THE EXTRAS

Once you've got your main synthesizer, you can start thinking about other components. How about a *drum machine* — a box that produces synthesized percussion? It's expensive, but for a performance-oriented musician, it's worth it.

Drum machines are button operated — they don't play easily like an instrument — but if your unit comes with special software, you can cut and paste rhythms together for a final sequence the device can play as you perform on your synthesizer.

Dr. T's Music Software markets an alternative drum-machine software controller

## SESSION IN PROGRESS

called **UpBeat** for 512K Macintoshes.

With MIDI, you can start small and add to your system piece by piece. **Rack-mount synthesizers**, for instance, so named because they mount in a rack like stereo components, give you the brain and sounds of a synthesizer without making you pay for another keyboard.

Components called **samplers** accept sound from an acoustic instrument or the human voice and translate it into MIDI data; with software such as Passport's **Alchemy** and Digidesign's **Sound Designer** for the Mac (part of Digidesign's high-end **Sound Tools** hardware/software package), you can edit the data and incorporate it into your synthesized compositions.

Alternatively, you can plug a **digitizer** card into your computer for the same purpose. For the GS, there's Applied Engineering's **Sonic Blaster**; for the Mac there's Farallon's **MacRecorder**. Accompanying software lets you edit the sound — cut and paste, and adjust volume, speed, fade, and so on.

The Mac LC includes built-in sound digitization and comes with a microphone; you can access this feature with a program called **Voice Navigator** from Articulate Systems.

### MIDI TALK

So what kind of data does your MIDI system generate? MIDI data describes a series of events that occur over time. The most important directly control the sounds coming out of your speaker by way of the synthesizer's voice. They're called *channel voice messages* and there are seven of them: note on, note off, polyphonic key pressure, channel pressure, program change, control change, and pitch-bend change.

*Note on* and *note off* are exactly what they sound like — they signal the beginning or end of a note. A note-on message usually contains the pitch of a note; some synthesizers can also sense its *attack velocity* — the speed at which you depress a key, usually interpreted as loudness, or volume.

*Polyphonic key pressure* and *channel pressure* measure how hard you press a key after a note has been played; your synthesizer will adjust vibrato or volume depending on the pressure. These messages are usually grouped together as *aftertouch*, or the way

Apple computers have earned a home in the studios of professional musicians — Joey Latimer and his Mac-based music system prove it. Latimer, a former recording engineer with a Southern California studio, now operates his own recording studio out of his house in Idyllwild — and a Macintosh SE helps him run his operation. In the studio's control room, the SE connects with Latimer's MIDI equipment, which includes a Kawai K-1 multitimbral synthesizer, a Roland MT-32 sound module, a Casio CZ-101 keyboard, and a Roland drum machine. Two mixing boards and a rackful of effects gear complete the hardware.

"You can simulate a whole band at your fingertips," says Latimer of his SE/MIDI setup. "If we write a new song and want to try it out to see what it sounds like with the band, we can do it. In fact, we can assemble all kinds of orchestration without much work at all."

Using **Vision**, a sequencer for the Macintosh from Opcode, Latimer can call up sampled sounds and electronic instruments to add texture to the tunes he cuts for others, and for himself. "I recorded my entire last album, *The Coyote and the Princess*, with the computer, so I could remaster it digitally," Latimer explains. "Everything we do is played into either the computer or the tape machine. That lets us try things out quickly, and makes all the sounds transportable." In other words, the Mac makes it possible to assemble and reassemble music in an infinite variety of ways for just the right sound. That ability will come in handy when Latimer takes his record company, Idyllwild Music, into the world of compact discs. Idyllwild plans to put out its first CD, a sampler of Latimer's five initial albums of contemporary folk music, this fall.

Latimer likes the Macintosh for several surprising reasons. For one thing, he says, "it has a small footprint [the space it occupies on the desktop]. And the Mac is very quiet and subdued compared to a PC," which often features fans that sound like rockets in the quiet of a studio.

Cutting records on a shoestring means cutting costs, too. The Mac helps by making it possible for an individual musician like Joey Latimer to create music without the expense of studio musicians or a live band. "I'm on my fourth Mac," he says. "I just like its style."

— Gregg Keizer

the note changes after you play it. A mechanism such as a volume pedal or a sustain foot switch send *control-change* messages. Most synthesizers have a built-in *pitch-bend* wheel for manual adjustment; it signals the synthesizer to bend the pitches it's playing either up or down.

*Program change* signals a synthesizer to switch voices — from flute sounds to piano, for instance. (Synthesizer voices are also called *patches*, because musicians once had to physically move wires called *patch cables* to get different sounds.)

Other types of MIDI data include *system real-time* and *system common* messages, received by all devices on the MIDI network to help coordinate timing and tuning.

All this data is transmitted through cables that carry 16 discrete channels apiece to and from your computer and your music system's components.

A MIDI device can "broadcast" and "receive" incoming data on any or all channels, according to the assignments you make at each MIDI device. In a large, complex system, all 16 channels can be busy at once,

carrying different messages to up to 16 different instruments.

### THE INTERFACE ROUTE

Cables are hooked into one of three kinds of ports: **MIDI IN**, **MIDI OUT**, and **MIDI THRU**. IN and OUT function as their names imply, bringing input and output to and from the synthesizer's microprocessor. The THRU port avoids the processor and sends out an exact copy of what was received at the IN port, allowing all devices in a network to have equal access to all 16 channels.

How does MIDI data get from your synthesizer and its accessories into your computer? You'll find several avenues open to you on this part of the MIDI journey. One of the simplest is Apple's own external **MIDI Interface** box (for either the GS and the Mac), which turns MIDI IN and OUT into Apple-standard serial input via cable through your computer's printer or modem jack.

Applied Engineering makes an external MIDI interface called **Audio Animator** for the GS; Roland makes a combination

interface for the IIe — the **MPU-401** external box with internal MIF-APL card. Passport Designs makes an external **MIDI Interface** for the Mac and the GS.

## THE FLIP SIDE

Anyone who has ever tried to edit MIDI data on a dedicated sequencer — something like word processing with a ten-key layout and a 12-character LCD — will appreciate the greater processing power and flexibility a computer can provide. Of course, simply hooking a computer up to your synthesizer doesn't automatically give you any more control over your music — that's where software comes in.

In the early days of recorded music, producers learned that if they recorded each musician on a separate track through individual microphones, they could get a cleaner sound and control the volume of each instrument when they mixed the

tracks back together. Also, if an artist blew a lick, they could just go back and rerecord that instrument, instead of making the whole band play the song over again.

Today, the technology has improved to the point that a musician can *punch in* — rerecord a specific section of a specific track. The process is called *track sequencing*, and in a modern studio it's possible for one person to play every instrument on an entire record, from drums to vocals to lead guitar. In fact, several pop stars have taken this approach.

Performers use sequencing to get their albums just right. Composers can use sequencing to hear what their full works will sound like, even though they can play only one instrument's score at a time. Similarly, using MIDI-compatible sequencing software in your home studio can let you create complex musical pieces even if you're not an instrumental virtuoso.

Sequencing programs offer a number of features, such as easily adjustable tempo controls, the ability to transpose pieces to different keys, and the option to cut, copy, and paste measures just as you would text with a word processor.

Most programs can also handle both step and real-time input with adjustable quantization values. For *real-time input*, you have the computer give you an audible tempo called a *click track* (sort of an electronic metronome) and play the music as you would normally. With *step input*, you can enter notes one at a time, then adjust their duration (and pitch, if necessary) manually and put them together via the software.

*Quantization* can make up for human timing errors by shortening or lengthening notes slightly to correct for rhythmically sloppy play. Quantization can be a great relief if your sense of timing isn't up

## PRODUCT INFORMATION

<b>Alchemy.</b> \$695 Mac	<b>ConcertWare+MIDI</b> Great Wave Software 5353 Scotts Valley Drive Scotts Valley, CA 95066 (408) 438-1990 Mac \$189.95 <b>MIDI Interface.</b> \$129.95 GS or Mac	<b>Jam Factory.</b> \$179 Mac <b>M.</b> \$179 Mac <b>Upbeat.</b> \$199 Mac Dr. T's Music Software 100 Crescent Road Needham, MA 02194 (617) 455-1454	<b>MIDIBASIC</b> Altech Systems 122 Faries Industrial Park Drive Shreveport, LA 71106 (318) 226-1702 <b>MIDI Interface</b> Apple Computer Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010 (800) 776-2333 \$99 GS or Mac	<b>Music Writer GS.</b> \$119 Limited, \$295 Special, \$595 Professional <b>Music Writer.</b> \$295 Special, \$595 Professional Apple II Pygraphics P.O. Box 639 Grapevine, TX 76051 (817) 481-7536 (800) 222-7536	<b>SynthLAB</b> Apple Programmers and Developers Association (APDA) Apple Computer Inc. 20525 Mariani Ave. MS-33G Cupertino, CA 95014-6299 (800) 282-2732 \$25 APDA members only GS
<b>Pro4.</b> \$495 Mac	<b>Deluxe Music Construction Set</b> Electronic Arts 1820 Gateway Drive San Mateo, CA 94404 (415) 571-7171 Mac \$129.95 Passport Designs 625 Miramontes St. Half Moon Bay, CA 94019 (415) 726-0280 (800) 443-3210	<b>Kawai America Corporation</b> 2055 East University Drive Compton, CA 90224 <b>Diversi-Tune</b> Diversified Software Research 9312 Harvey Road Silver Spring, MD 20910 (301) 942-2261 GS	<b>MPU-401.</b> \$199.50 Apple IIe <b>MIF-APL.</b> \$130 Apple IIe <b>Kurzweil Music Systems</b> 411 Waverley Oaks Road Waltham, MA 02154 (617) 893-5900	<b>Performer.</b> \$495 Mac <b>Professional Composer.</b> \$495 Mac Mark of the Unicorn 222 Third St. Cambridge, MA 02142 (617) 576-2760	<b>Vision</b> Opcode Systems 3641 Haven Drive Suite A Menlo Park, CA 94025 (415) 369-8131 \$495 Mac
<b>Audio Animator.</b> \$219 GS	<b>Finale</b> Coda Music Software 1401 East 79th St. Minneapolis, MN 55425-1126 (612) 854-1288 \$749 Mac	<b>MacRecorder</b> Farallon Computing 2000 Powell St. Suite 600 Emeryville, CA 94608 (415) 596-9100 \$249 Mac	<b>Music Studio 2.0</b> Activision 3885 Bohannon Drive Menlo Park, CA 94025 (415) 329-0800 available from mail-order sources GS	<b>Sound Tools with Sound Designer</b> Digidesign 1360 Willow Road Suite 101 Menlo Park, CA 94025 (415) 688-0600 \$3285 Mac	<b>Voice Navigator II</b> Articulate Systems 99 Erie St. Cambridge, MA 02139 (617) 876-5236 \$795 Mac
<b>Sonic Blaster.</b> \$129 GS	Applied Engineering P.O. Box 5100 Carrollton, TX 75011 (214) 241-6060				<b>Yamaha Corp. of America</b> P.O. Box 6600 Buena Park, CA 90622 (714) 522-9011
<b>Casio, Inc.</b> 15 Gardener Road Fairfield, NJ 07006					

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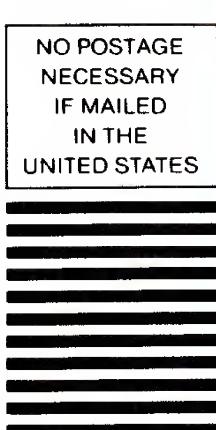
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to snuff, but sometimes such error correction can give recorded music an awkward, mechanical feel. To avoid such lifelessness, some sequencer programs can randomize the timing slightly on playback to make the music sound more human. Or, of course, you can just turn quantization off and wing it.

Sequencing options include Diversified Software's GS program **Diversi-Tune** for play-by-ear music amateurs. Apple's own sequencing program, **SynthLAB**, came and went in a storm of sound and fury that produced a special tool for GS MIDI programming (**MIDI Synth**) and a beta version that has never been finalized.

**SynthLAB** turns your GS into a capable synthesizer via the machine's Ensoniq sound chip, and adds a stunted but functional sequencer. It's little more than an electronic multitrack tape deck — you can lay down up to 32 separate tracks, but you can't cut and paste sections, nor can you punch in and rerecord a section; you have to record the whole track over.

One of **SynthLAB**'s strengths is that it can handle MIDI data as a background event with the help of the **MIDI Synth** tool set, letting you work while your machine plays. **MIDI Synth** is part of Apple's System 5.0.4 update, and **SynthLAB** is available from APDA (Apple Programmers and Developers Association) in beta form.

For budding Apple II composers, *transcription programs* — software that lets you enter your music note by note on screen, on traditional staves, and focuses more on music writing than performance — are a must. Activision's **Music Studio** for the GS is a good choice for beginners; it lets you edit each sound as well as your written notes. **Music Writer**, from Pygraphics' Pyware line in versions for the GS and the IIe/IIc, also includes a mini-sequencer and the ability to handle MIDI input; the program can even transcribe your synthesizer's music to a grand staff on screen as you play.

For Mac music buffs, MIDI sequencers range from basic-level programs such as Passport's **Trax**, through more powerful programs such as Intelligent Music's **Jam Factory** and **M**, all the way up to high-end professional packages such as Passport's **Pro4**, Mark of the Unicorn's **Performer**, and Opcode's **Vision**.

MIDI-compatible transcription products for Mac musicians include Electronic Arts' **Deluxe Music Construction Set** for beginners, Passport's **Encore** (which transcribes to an on-screen staff as you play your synthesizer), Mark of the Unicorn's **Professional Composer**, and Coda's **Finale** for high-end projects.

Of the mid-range packages available for the Mac, **ConcertWare+MIDI** from Great Wave Software is one of the most versatile. Most sequencing programs emphasize tracks and measures, but ConcertWare+MIDI lets you work with musical notation.

Once you have your basic song in memory, the software lets you add dynamic markings, crescendos, repeats, and so on as you see fit, and print your completed score.

**ConcertWare+MIDI** handles MIDI data flexibly, is especially good at dealing with polytimbral synthesizers, and even includes built-in "instrument maps" of some of the more popular synthesizers. (Each instrument within a synthesizer is assigned a number; an instrument map indicates which instrument within that particular synthesizer model is assigned which number.) The program's patch editor, *Instrument Maker*, offers both graphics-based and numeric control over waveforms and harmonics, and playing with them can be an entertaining lesson in sound theory.

For those of you who want to try your hand at MIDI programming on the Mac, Altech Systems offers a package called **MIDIBASIC**, compatible with both Microsoft BASIC and Zedcor's ZBASIC computer languages.

### PUMP UP THE VOLUME

It's true that you can get started making Apple music with just a bare-bones system, and there are a slew of compatible non-MIDI programs out there. Even a IIe can produce some entertaining tunes with a sound card plugged in; the GS is pretty versatile, too, with its built-in 15-voice Ensoniq synthesizer chip.

But if you love music, if you're serious about performance and composition, if you want to experiment with sound and push your instrument to the limit, the MIDI standard (especially for Macs) is the

## FURTHER READING

### FEATURES

- "Making Music," August 1987, p. 38
- "Apple Serenade," May 1988, p. 70
- "Face the Music," October 1989, p. 34
- "Is It Live or Is It Apple II?" August 1990, p. 52

### EDITORS' CHOICE

- Instant Music, October 1987, p. 144
- Diversi-Tune, September 1988, p. 112
- Sonic Blaster, May 1989, p. 108
- Instant Synthesizer, July 1989, p. 108
- Jam Session, March 1990, p. 108

### REVIEWS

- Phasor, March 1987, p. 24
- Personal Musician, February 1988, p. 97
- FutureSound, March 1989, p. 32D
- Sound Ace, June 1989, p. 36
- Sonic Blaster, June 1989, p. 36
- Music Writer, June 1989, p. 40
- Music Shapes, June 1989, p. 40
- MasterTracks Jr., June 1989, p. 110
- Instant Synthesizer, September 1989, p. 28
- MasterTracks Pro GS, January 1990, p. 100

### LEARNING CURVE

- "Music to My Ears," September 1990, p. 88

## RESOURCES

### Computer Literacy for Musicians

Fred Hofstetter  
\$41 Prentice-Hall

### Electronic Musician magazine

P.O. Box 3747  
Escondido, CA 92025-9860

### Keyboard magazine

P.O. Box 50404  
Boulder, CO 80321-0404

### MIDI for Musicians

Craig Anderton  
\$16.95 Roland Corp. US

### Music Through MIDI

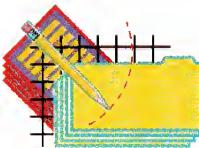
Michael Boom  
\$18.95 Microsoft Press

### What's a Synthesizer?

Jon Eiche  
\$5.95 Hal Leonard Books

top of the line and you won't be satisfied with anything less.

So come on! What are you waiting for? There's only one guitar named Lucille, and B.B. King isn't too fond of loaning her out. But plug yourself into a MIDI system, and you can act nonchalant and say things like "Yeah, me and M.C. — we got this MIDI thing down. Yo Apple! Drop the beat!" □



# APPLEWORKS IN ACTION

## YE OLD TAX TRACKER

**Get a head start on next year's return by using this spreadsheet to track deductible expenses.**

By RUTH K. WITKIN

WANT TO KNOW HOW TO BE YOUR own best friend? Keep track of tax-related expenditures all year long, so that when tax time comes you can calmly (calmly?) and rationally (rationally?) project your exposure or prepare your return. For instance, you may need to know how much you spent on medical and dental care, what you paid in state income tax, and your total contributions to charitable causes. All these amounts (and more) are deductible on your income tax return.

Do you think you need a bloodhound to keep track of these items? Not at all. The powerful, easy-to-use spreadsheet in **Figure 1** can do it for you. It takes the amounts you enter and distributes them into 11 tax-deductible accounts, then sums the amounts in each account. (As always, kudos to my favorite tax consultant, George Stein, C.P.A., for expert advice given so graciously.)

### A SPREADSHEET FROM SCRATCH

Create a new AppleWorks spreadsheet file named **TAXTRACKER**. The *Review/Add/Change* screen appears with the cursor in cell A1. Create horizontal lines across columns A through R (162 characters). Going the normal AppleWorks route, you'd work in 78-character segments, typing quotation marks before each segment and doing lots of keystroking. There's an easier way: Simply reduce the width of the

columns, enter each line (now shortened considerably) in one step, then widen the columns. Here's how:

1. Narrow the columns: With the cursor on A1, press Open apple-L (OA-L) to start the *Layout* command, type **C** (for *Columns*), press OA-Right Arrow twice, then Right Arrow twice to highlight column R, and hit Return. Type **C** (for *Column width*), press OA-Left Arrow seven times to reduce the highlighted columns to two characters each, and hit Return again.
2. Enter a double line across row 2 in columns A through R: Place the cursor on A2 and type quotation marks to tell AppleWorks that the next character is a label, not a mathematical operator. Hold down the equal-sign key until the sign reaches the right edge of R2, then move the cursor to A6.
3. Enter a single line across row 6 in columns A through R: With the cursor on A6, type quotation marks. Hold down the minus-sign key until the sign reaches the right edge of R6, then move the cursor to A35. Enter a single line in row 35 and hit Return.
4. Widen the columns: With the cursor on A35, press OA-L, type **C**, press Right Arrow 17 times, and hit Return. Type **C**, press OA-Right Arrow seven times, and hit Return again. AppleWorks now "stretches" the line to fill the increased width.

This neat technique really shortens the time it takes to enter long lines. **Tip:** Don't reduce columns to less than two characters wide because AppleWorks won't stretch

a line entered in one-character columns.

Now use the following summary to continue the spreadsheet setup:

**Column width.** Each column is now a uniform nine characters wide. Use OA-L, *Columns*, and *Column width* as follows: Reduce column A by two characters; column B by three characters; column C by six characters; column F by two characters; and column G by eight characters. Increase column D by 20 characters and column E by two characters.

Column C prevents the right-justified numbers in column B from bumping into the left-justified text in column D, while column G is just wide enough to hold the vertical line separating entries in the tracker from the formulas in the accounts area.

**Vertical line.** With the cursor in G1, type quotation marks, hit the vertical line (it shares the backslash key), and press Return. Copy the line from G1 into G2 through G36: Leave the cursor on G1, press OA-C, hit Return to confirm *Within worksheet*, and press Return again to confirm G1 as the source. Move the cursor to G2 and type a period, then move the cursor to G36 and hit Return.

**Labels and numbers.** **Figure 2** shows the sample entries you type, but first here are a few instructions:

- To tell AppleWorks that the *1991* in A4 is a label, not a number, type quotation marks first.
- Do the same in I1, first making sure that columns I, J, and K are on screen so that AppleWorks can accept the entire title.
- In E5, press the spacebar once after typing **Amount**. This space aligns the label with other labels when you right-justify later.

To speed things up, turn off automatic calculation: Press OA-V and type **RFM** (for *Recalculate Frequency Manual*).

Now enter the labels and numbers. After typing each entry, just move the cursor to the next cell needing an entry. This serves the same purpose as pressing Return, and saves one keystroke every

11 TAX DEDUCTION TRACKER		1991 DEDUCTION ACCOUNTS														
41991 Check SDate Number	Issued To/Allocation	Check or Allocated Amount	Act Code	Medical Payment	Med/Dent Premium	Dental Payment	Mortgage Interest	Personal Contrib	State Interest	Prop Tax	Inc Tax	Invest Interest	Moving Exp	Unreimb Exp	Misc Exp	
		1	2	3	4	5	6	7	8	9	10	11				
71Jan 1	422	Blue Star Medical Insurance	456.72	2												
81Jan 2	423	County Personal Property Tax	25.00	6										25.00		
91Jan 2	424	Shoreline/Mortgage Interest	778.54	5	1									778.54		
101Jan 2	425	American Red Cross	50.00	4	1									50.00		
111Jan 2	426	Professional Salesperson Assn	125.00	11	1									125.00		
121Jan 5	427	Dr. David Campbell	75.00	1	1	25.00										
131Jan 5	428	VistaCard/Business Entertain	121.98	10	1									121.98		
141Jan 10	434	Shoreline Trust Safe Deposit	34.00	11	1									34.00		
151Jan 12	437	Abner Health Pavilion	25.00	1	1	25.00										
161Jan 12	438	JJ Brokerage	40.00	8	1									40.00		
171Jan 25	442	PWIC	75.00	4	1											
181Feb 2	444	Shoreline/Mortgage Interest	778.05	5	1									778.05		
191Feb 3	445	VistaCard/Amer Air-Cleveland	200.00	10	1									200.00		
201Feb 17	449	VistaCard/Hotel Cleveland	122.00	10	1									122.00		
211Mar 2	456	Shoreline/Mortgage Interest	777.55	5	1									777.55		
221Mar 15	462	AmExpress/Business Entertain	112.00	10	1											
231Mar 17	463	Est State Tax Installment	150.00	7	1									150.00		
241Mar 26	465	Dr. Bernice Hardwick	278.00	3	1									278.00		
251Mar 26	467	Abner Boys Club	25.00	4	1									25.00		
261Mar 2	469	Shoreline/Mortgage Interest	777.05	5	1									777.05		
271Apr 4	470	Balance 1991 State Tax	125.00	7	1									125.00		
281Apr 4	471	Blue Star Medical Insurance	456.72	2	1									456.72		
291Apr 7	472	Dr. Bernice Hardwick	75.00	3	1									75.00		
301May 2	489	Shoreline/Mortgage Interest	776.54	5	1									776.54		
311May 23	495	George Stein, C.P.A.-Tax Prep	165.00	11	1											
321Jun 2	499	Shoreline/Mortgage Interest	776.03	5	1									776.03		
331Jun 15	503	Est State Tax Installment	150.00	7	1									150.00		
341																
351		Totals		2	1	100.00	913.44	353.00	150.00	4,663.76	25.00	425.00	40.00	0.00	585.98	324.00

Figure 1. Completed tax-tracker spreadsheet. Highlighted areas show locations of formulas.

11 TAX DEDUCTION TRACKER		1991 DEDUCTION ACCOUNTS													
41991 Check SDate Number	Issued To/Allocation	Check or Allocated Amount	Act Code	Medical Payment	Med/Dent Premium	Dental Payment	Mortgage Interest	Personal Contrib	State Interest	Prop Tax	Inc Tax	Invest Interest	Moving Exp	Unreimb Exp	Misc Exp
		1	2	3	4	5	6	7	8	9	10	11			
71Jan 1	422	Blue Star Medical Insurance	456.72	2											
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321Jun 2	499	Shoreline/Mortgage Interest	776.03	5	1										
331Jun 15	503	Est State Tax Installment	150.00	7	1										
341															
351		Totals		1											

Figure 2. Labels and numbers to type into tax-tracker spreadsheet.

time. When you're finished, press Return. **Formats.** Use the Value command (OA-V) to set a standard *Value format* of Commas with two decimal places. Next, use the Layout command (OA-L) and Block to reformat the cells in rows 7 through 34 of columns B (*Check Number*) and F (*Act Code*) to show Commas with no decimal places. Also use OA-L and Block to reformat H5 through R5 with *Appropriate*. Use OA-L and *Label format* to right-justify E3 through F5, H3 through R4, and D36. Now press OA-S to store all your work on disk. Columns A through F are similar to a

standard check ledger. They contain dates, check numbers, payees, amounts, and account numbers. The check numbers are only for reference. The account numbers determine the category into which the check amount is placed eventually. That's where the similarity ends.

Here, you're not interested in every check written, only those fitting into tax-deduction accounts. For instance, you'll enter medical payments and charitable contributions, and omit checks for disability insurance and IRA contributions. Also, you're not concerned with the

entire check amount, only that portion allocated to a tax-deductible account; you'll enter the entire Blue Star Medical Insurance check (#422), but only the interest part of the Shoreline Trust mortgage-payment check (#424). The slash after Shoreline indicates a partial amount. Accounts 1 through 10 follow the IRS pattern and are self-explanatory. The *Misc Exp* account in column R holds such diverse items as union dues, business- or professional-association dues, work clothes, the cost of looking for a new job, job-agency fees, tax-advice and -preparation fees, and rental of a safe-deposit box. All these items, plus unreimbursed employee expenses (which appear here in their own column, but are normally part of *Misc Exp*) are subject to the 2 percent floor.

Please note that not every conceivable deduction that could be taken on a tax return is mentioned here. Consult your tax adviser for any additional deductions to which you may be entitled. At the end of this article I describe how to add columns to hold them.

Now enter the formulas that perform the calculations in columns H through R and in row 36. First read how the formula works, then place the cursor on the cell receiving the formula. Move the cursor to the cell location shown in the formula and type everything else.

When the formula is complete, compare each character on your screen with the way it appears here. If everything agrees, press Return. If something's amiss, press Escape and start again.

#### FORMULA 1: Medical Payment

Cell location: H7

Formula: @IF(F7=H5,E7,"")

Formula 1 either enters the check amount or makes the cell appear empty (as it does in H7). The *Test* statement compares the account number (F7) with the account number in the column heading (H5). If they match, the *Then* statement copies the amount in E7 and enters it in its cell. No match, and the *Else* statement enters double quotation marks, essentially making the formula "disappear."

Copy Formula 1 into the cells to the right, where each can match its own account number in the column heading to the account number in column F: Leave the cursor on H7 and press OA-C. Press □

# APPLEWORKS IN ACTION

Return twice (to confirm *Within worksheet and Source*). Move the cursor to I7, type a period, move the cursor to R7, and hit Return again. AppleWorks pauses with a highlight on F7 in the entry line, asking you to identify F7 as a *No change* (absolute) or *Relative* reference in its copied location. F7 and E7 are absolute, while H5 is relative, so press Return, type **R**, and hit Return again. Press OA-K to recalculate, which makes 456.72 appear in I7.

Now copy that row of Formula 1s down their respective columns: With the cursor on H7, press OA-C and hit Return. Move the highlight to R7 and hit Return again. Press Down Arrow, type a period, move the highlight to H34, and hit Return.

Again, AppleWorks asks you to identify absolute and relative cell references. This time type **R**, press Return, and type **R** again. As AppleWorks highlights each formula, hit the same keys: **R**, Return, and **R**. Now press OA-K again to display the numbers.

Compare your results with those in **Figure 1**. If there's no match, check the construction of Formula 1 in H7, re-entering the formula and repeating the copy instructions if necessary. Now protect Formula 1 and all its incarnations: Place the cursor on H7 and press OA-L. Type **B**, press OA-8, then Down Arrow four times to reach H34. Then hit OA-Right Arrow once and Right Arrow enough times to reach column R. Hit Return, then type **PN** (for *Protection Nothing*).

## FORMULA 2: Total Amount

Cell location: E36

Formula: @SUM(E35:E6)

Formula 2 adds the amounts in E34 through E7 to produce the total in E36. The formula includes the lines in E35 and E6 to create a solid range. If you later insert new rows anywhere in this range, AppleWorks adjusts the cell references to add the new entries along with the old.

Now copy Formula 2 into the account-total cells to the right: With the cursor on E36, press OA-C and hit Return twice. Move the cursor to H36, type a period, move the cursor to R36, and hit Return again. Press OA-R twice to tell AppleWorks both cells are relative. Press OA-K. Now protect these formula cells: Leave the cursor on E36 and press OA-L. Type **R** (for *Rows* — it doesn't matter that blank cells and the vertical-line cell G36 are

included), and hit Return. Type **PN**. Press OA-S to store your work on disk.

## YES, IT DOES WINDOWS

When you work on a spreadsheet as wide as this one, a second window that lets you view two diverse areas is a must. To see how this works, press OA-1, then position the spreadsheet so that column E (*Check or Allocated Amount*) is the first column on the screen. Now place the cursor in column H, press OA-W, and hit Return to confirm *Side by side*. AppleWorks creates two windows instantly — one containing amounts and accounts, the other containing account categories 1 through 5.

Suppose you want to see account 10, which should reflect the amount in F13: Press OA-Right Arrow twice, and there, in Q13, is 121.98. Scan categories 6 and 8, and you can see other amounts in their proper places. If you wanted to make changes in the amount or account, you could jump back and forth between the windows by pressing OA-J. Reunite the windows by pressing OA-W and hitting Return (for *One*).

This spreadsheet is 163 characters wide, and prints on two sheets of paper. Press OA-O to bring up the *Printer Options* screen. To print as much as possible on the first sheet, choose a smaller character size: Type **CI** (for *Chars per Inch*) and press Return. Type **17** and hit Return again.

Next, set the margins: Type **LM** (for *Left Margin*), press Return, type **.3**, and hit Return again. Now type **RM** (for *Right Margin*), press Return, type **.3**, and hit Return. Finally, type **TM** (for *Top Margin*), press Return, type **.3**, and hit Return once more. Press OA-S to store this final version on disk, and to return the spreadsheet to the screen.

Turn on your printer and make a hard-copy of your spreadsheet: Leave the cursor where it is and press OA-P to bring up the *Print* screen. Hit Return to confirm *All*. Press Return to select the printer (or type a printer number, then Return), type today's date (or, if your computer has a clock, type an asterisk **@** to have AppleWorks enter the date for you), and hit Return twice. The printer chugs away, producing the spreadsheet.

The best time to add more entry rows is when you're down to your last empty one.

You can copy this row (with its formats and formulas, but without entries) to the clipboard, then copy it back into the spreadsheet. On this spreadsheet you've filled every available row but row 34. Here's how to use it to expand the entry section:

1. Place the cursor on A34 and press OA-C.
2. Select *To clipboard* and hit Return twice (to confirm *Rows*).
3. Leave the cursor on A34 and press OA-C again. This time select *From clipboard*, then confirm *Formulas and values*.

AppleWorks now inserts a brand-new row, ready for new entries. You can copy from the clipboard as many times as you want new rows and, each time you do, AppleWorks adjusts the cell references in the SUM formulas to include the new rows.

If you need more account categories, the easy approach is to add them after the last category. Here are the steps:

1. Place the cursor on R1 and press OA-C.
2. Select *To clipboard*, type **C** (for *Columns*), and hit Return.
3. Leave the cursor on R1 and press OA-C again. This time select *From clipboard* and confirm *Formulas and values*.
4. Enter a new account name and number in the heading, and press OA-K to recalculate.

You can copy from the clipboard as many times as you want new accounts. Keep in mind that entries in columns B and F are in a nonstandard format, which means that blanking them also blanks out their format. While this isn't the end of the world, reformatting them takes time. To avoid extra work, overtype (don't blank) and check numbers and account codes when editing this spreadsheet.

## NEXT MONTH

If you're responsible for assigning people to client projects, allocating time for project phases, and coming up with a cost estimate, be sure to check out the project cost-estimate spreadsheet in next month's column. □

CONTRIBUTING EDITOR RUTH K. WITKIN IS THE AUTHOR OF THE *SUCCESS WITH APPLEWORKS TEMPLATE SERIES* (INCIDER/A+, IDG COMMUNICATIONS/PETERBOROUGH) AND *RUTH WITKIN'S NEW APPLEWORKS TEMPLATES* (QUALITY COMPUTERS). WRITE TO HER AT 5 PATRICIA STREET, PLAINVIEW, NY 11803. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A REPLY.

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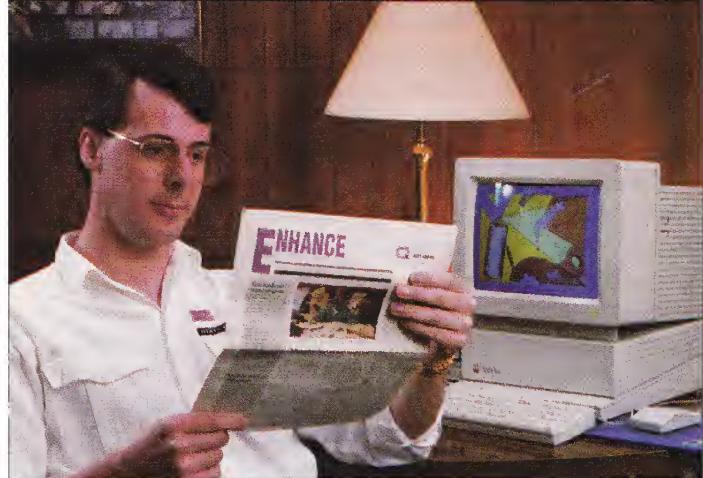
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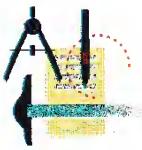


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## PRESS ROOM

# DESKTOP-PUBLISHING STAR SEARCH

**Two *inCider/A+* readers capture the spotlight with projects they've designed themselves.**

By CYNTHIA E. FIELD, Ph.D.

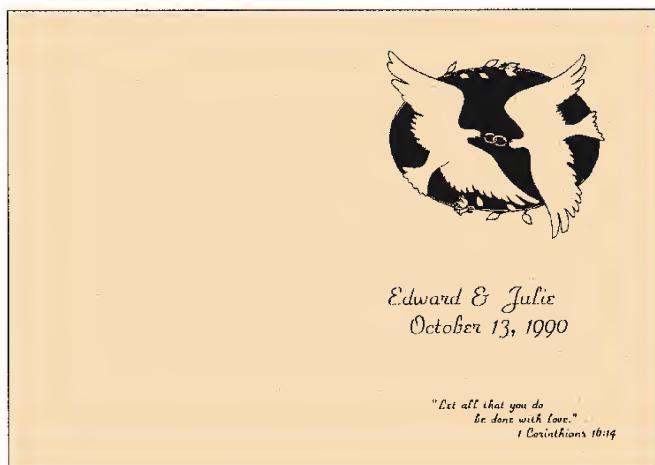
HERE AT *INCIDER/A+*, WE DON'T believe in keeping talent a secret — especially when it comes to great desktop-publishing projects. After all, hidden talent is nothing more than a waste of a good idea. So let's take a look at two projects *inCider/A+* readers shared with us recently. First we'll show you how to create an elegantly printed program for a wedding — or any special occasion, for that matter. Practically all you need is a glue stick. Next we'll re-create letterhead and envelope templates designed by a professional photographer. Whether you need personalized stationery for friendly letters

or business correspondence, these templates will get you off to a quick start.

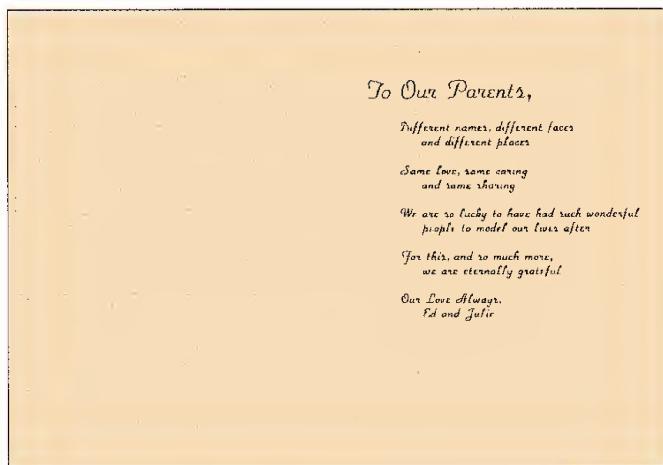
### PRECIOUS MEMORIES

If you've ever planned a wedding, you know that you must arrange most details months in advance. When Edward Girard's fiancée, Julie, suggested just a few weeks before their ceremony that they provide wedding programs to their 200 guests, Girard might have panicked, but he didn't even flinch. Girard not only knew that **Publish It! 3** was equal to the task, he figured that producing the booklet themselves would save money as well as time. How right he was!

"Julie created a few samples by hand to



**Figure 1. Placement of cover elements on photocopying master. The blank left-hand side forms the eighth page of the booklet; the right-hand side forms the cover.**



**Figure 2. Girard glued the dedication on the back of Figure 1. After folding the pages into a 5.5-by-8.5-inch booklet, the left side forms page 2 and the right side forms page 7.**

give me an idea how she wanted the program to look," says Girard, who prepared the publication's text with the **AppleWorks 3.0** word processor. After saving the word-processing file on a data disk, he started up **Publish It! 3**, added a couple of pages to the layout (*Page* menu), drew a text frame on each page (text tool), and then linked the frames (linking tool) to accommodate his imported AppleWorks file (*File* menu).

Like many brides, Julie opted for an elegant script-like font, and she wanted some artwork on the program's cover. Girard chose the *Kenilworth* typeface from Timeworks' **Font Pack 1**, a **Publish It!** accessory product. He used the *36-point* size for headings and the *18-point* size for body text. The "lovebirds" illustration came from Dover's **Ready-to-Use Wedding Illustrations**. (See **Figure 1**.) Employing special fonts with **Publish It! 3** is easy. Use the *Install Font* option listed in the *Apple* menu. In the publication-in-progress select the desired text with the mouse. Pull down the *Font* menu and choose *Select Font*.

Formatting is even simpler. Select the text, pull down the *Format* menu, and choose *Justification*. That's how Girard arranged his program, including the centerfold featuring short "biographies"

of the wedding party. (See **Figures 1-4**.)

Girard saved his publication on disk and printed it on a dot-matrix printer in Publish It!'s best-quality mode. To further enhance appearance, he photocopied the pages at 80-percent reduction, which smoothly blended the dots making up each character. Next he separated the text areas with an X-acto-type knife and glued the panels in proper sequence onto both sides of two blank 8.5-by-11-inch sheets of paper. **Figures 1** and **2** make up the front and back of one master sheet, and **Figures 3** and **4** make up the front and back of the second master sheet.

After photocopying these masters onto ivory-colored, linen-textured paper, Girard folded and stapled the sheets into two-page 5.5-by-8.5-inch programs. (The blank left-hand side of **Figure 1** forms the eighth page of the booklet; the right-hand side forms the cover. The left-hand side of **Figure 2** forms the second page of the program; the right-hand side forms the seventh page. The right- and left-hand sides of **Figure 3** become pages three and six of the wedding program. **Figure 4** forms the centerfold, pages four and five.) "Everyone thought the programs were done professionally," says Girard. "They certainly added an impressive touch to our wedding."

## PICTURE THIS

Indiana reader Don Wood wasn't the photographer hired to shoot Edward and Julie's wedding in Texas, but he's logged many such occasions. For nearly a quarter century, Wood has been a professional

OBJECT	LEFT START	TOP START	WIDTH	HEIGHT	OTHER SPECs
<b>Letterhead Objects</b>					
<b>GRAPHICS FRAMES:</b>					
Camera (left)	0.213	0.147	1.851	1.111	
Camera (right)	5.463	0.209	1.851	1.111	
<b>TEXT FRAMES:</b>					
"Group Photography" label	0.250	0.795	1.795	0.388	
Phone label	0.230	1.372	1.241	0.297	
Name and address	2.815	0.201	2.163	1.872	Transparent
"For the people" label	5.281	0.869	1.277	0.388	
Main letter area	0.250	2.165	7.245	7.630	
<b>SHAPES:</b>					
Round corner box	2.758	0.109	2.222	1.093	50% Fill
Thick rule	0.229	2.250	7.281		Line Weight #3
<b>Envelope Objects</b>					
<b>GRAPHICS FRAMES:</b>					
Apple IIgs graphic	0.113	1.350	2.041	1.750	
Camera graphic	0.506	1.608	1.048	0.647	
<b>TEXT FRAMES:</b>					
Return-address label	0.138	0.370	2.379	0.929	
"Apple IIgs" label	0.490	2.393	1.102	0.240	
Addressee panel	3.579	2.125	4.000	1.000	

**Table. Specifications for Don Wood's letterhead and envelope templates (in inches).**

photographer at the "Photos by Don Wood" studio in Madison, Indiana. He also works full-time at the *Madison Courier*.

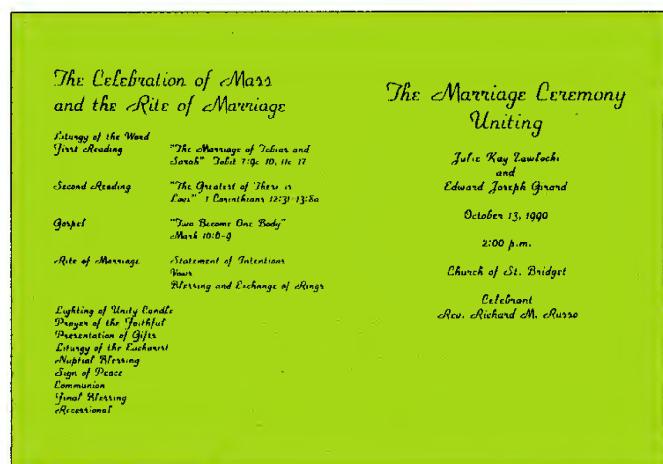
When he's not busy playing photographer, Wood turns to Publish It! 3 to design creations for his studio and his parish church's Knights of Columbus council. But Wood's letterhead and envelope templates impress us most, because they'll appeal to anyone who wants to spiff up correspondence the easy way. In the accompanying **Table** we provide the specifications for Wood's letterhead and envelope projects.

Copying the letterhead design takes less than a half-hour. (See **Figure 5**.) Start

up Publish It! 3 and press Open apple-4 (OA-4) to work in *Size to Fit* mode. You'll use a half-dozen tools for this project, including the pointer, the graphics frame tool, the text tool, the I-beam, the round-corner box tool, and the line tool.

As your design progresses, you'll want to switch from one viewing mode to another. Use the *Special* menu to choose the magnification you want, or try memorizing the faster keyboard commands OA-1 (*Show Full Size*) through OA-4.

To begin, select the proper tool, draw the object, and make it conform to Wood's design. Select the object (click on it with



**Figure 3.** The text glued to the right- and left-hand sides of this master page become pages three and six of the wedding program.



**Figure 4.** Girard glued the names of the wedding party to the back of Figure 3 to form pages four and five (the centerfold) of the master copy.

# PRESS ROOM

the pointer) and press OA-M, or pull down the *Objects* menu and choose *Show Specifications*. Edit the dimensions in the dialog box to match those in the **Table**.

The letterhead template shows off some special Publish It! 3 features. For one, the text frame containing the studio's name and address is transparent. (Click on *Transparent* in the object's *Show Specifications* dialog box). A transparent text frame prevents the rounded rectangle from masking the studio's name, or vice versa; instead, the shape shows through to enhance the text.

Wood chose the outline type style (*Font* menu) to make his company's name stand out on its shaded background. He selected the *50% Fill* swatch from the pattern palette (*Objects* menu) before drawing the round-corner box.

Create the rule separating the letterhead area from the main text area below by selecting the third thickest line weight (#3) in the *Set Line Weight* dialog box (*Objects* menu). Then draw the line with the line tool. Drag the line into position with the mouse, or use *Show Specifications* and the **Table** data to snap the line into place automatically.

When your letterhead design's completed, save it as a template on a data disk. Print a copy using Publish It!'s double-strike printing mode, and consider duplicating the letterhead with a photocopier. That way, you can use it not only with your desktop-publishing program, but with a word-processing program such as AppleWorks. Just friction-feed a sheet of letterhead into your printer and advance the page so that the printhead's just below the preprinted area.

As an alternative, write your letters with Publish It! 3. Open the letterhead template, insert the I-beam into the large text frame, select a font, and type away. Better yet, compose your letter with the AppleWorks word processor, look over your typing with that program's spell checker, save the file, then import it into the Publish It! letterhead template. If you

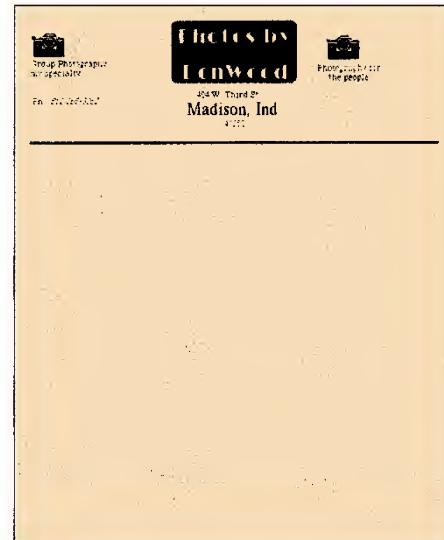
plan to save a copy of the letter on disk, select the *Save As* feature (*File* menu) and type a unique name.

As the screen dump shows, Don Wood's envelope template consists of a graphics area and two text frames. (See **Figure 6**). One text frame accommodates the return address, the other the recipient's address. Wood designed a fairly complicated illustration for his envelope. Onto the underlying computer clip art he superimposed a second graphics frame with a camera graphic and a text frame with the label "Apple IIGS." Your design needn't be that elaborate, but it's fun to explore the possibilities anyway. When your envelope template's completed, save it with a meaningful name on a data disk.

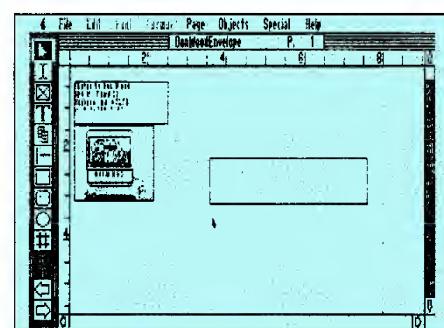
Prepare a batch of preprinted envelopes like the one shown in **Figure 7**. Later on add the recipient's address with a typewriter, or use Publish It! to address a custom envelope for each letter you write.

First, open the template, insert the I-beam into the addressee panel, and enter the recipient's name and address. Thanks to Publish It! 3's Clipboard, you can even copy (OA-C) the recipient's address from the letter, close the letter file, open the envelope template, and paste (OA-V) the address into the addressee panel. Why type the same thing twice? Experiment with various fonts and formatting options before printing your envelopes. We discovered that centered addresses are a nice touch.

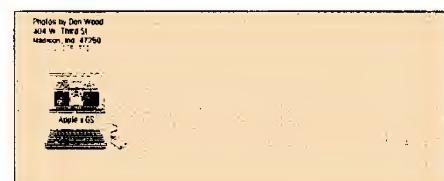
Insert a #10 business envelope into the printer as you would an ordinary sheet of paper. Line up the left edge of the envelope with the single-sheet icon on the ImageWriter II's back cover and press the form-feed button once to advance the envelope to the top-of-page setting. Because most envelopes are thicker than computer paper, you may want to move the printer's paper-thickness lever down a notch or two to prevent jamming. Use similar methods to orient



**Figure 5. Don Wood's letterhead.**



**Figure 6. Screen dump showing Don Wood's envelope design with addressee-panel text frame.**



**Figure 7. Don Wood's envelope design.**

envelopes in other printer models.

Whether you're planning a special celebration or designing custom stationery, Publish It! 3 and an Apple II are the perfect match. If you've created something special with your Apple II or Macintosh and would like us to consider sharing it with other Press Room readers, send us printouts and a copy of the file(s) on disk. Include a cover letter telling us a little bit about your project. We'll drop you a line to let you know what we think.

Who knows? We might even design a new letterhead template just for the occasion! □

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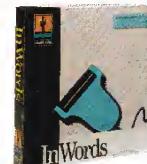
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# APPLESOFT ADVISER

## BIT-MAP ATTACK

**What good are all those graphics images if you have to annotate them from the text window?**

By DAN BISHOP

YOUR MONITOR SEEMS TO SNEER as you look up blearily from the program you've been slaving over for weeks. On screen, four images of temptingly realistic fruit rotate slowly. Your instructional program on the mangoes of Southern Fiji is perfect, except for one detail: You need to label the drawings — but all you have to work with is the four-line text window at the bottom of the screen. Your hands crash down on the keyboard in frustration, sending up a shower of Doritos and splinters of plastic. You're a master of graphics programming, but the ability to place text in a graphics window remains beyond your reach.

Last time, in "Smashing the Hi-Res Barrier" (April 1991, p. 70), you learned a method for converting the high-resolution page 2 graphics screen to mixed text-and-graphics mode and to POKE text into memory so that it would appear in this window.

This month we'll throw mixed mode out the window (pun intended) and develop a method for creating text anywhere on the graphics screen, so that you can use full-screen graphics and still incorporate text. This technique lets you create your own style of text characters, or engineering, mathematical, or chemical symbols. To illustrate this capability, we'll provide the code needed for both English and Cyrillic (Russian) alphabets. What could be more

appropriate in this age of *glasnost* than teaching your Apple II to speak Russian?

### DEFINING THE CHARACTERS

Although you could use shape tables to define and use graphics characters, there's an easier method. (See "Command Performance," November 1990, p. 70, for details on using shape tables.) Instead of using vectors, you'll define each character by eight numbers that represent the lighted pixels (dots) in each of the eight rows of a character block. You'll then POKE these values into RAM for safe storage before you run your graphics program, then copy the values as needed directly onto the graphics screen. What makes this procedure possible is the fact that the Apple hi-res graphics screens are bit-mapped, meaning that every pixel corresponds to a single bit in RAM.

Starting with a sheet of graph paper, mark off a block with seven vertical columns and eight horizontal rows. Each square represents a pixel on the graphics screen. Each graphics object (character or symbol) must fit within this grid, although you can piece together larger objects by displaying several of these blocks side by side. Number each column at the top of the grid with a column value, starting at the left. These column values are 1, 2, 4, 8, 16, 32, and 64. Draw the desired object by shading squares on the grid. (See **Figure 1**.)

Each of the eight rows will have a value that's determined by the position of the shaded squares in that row. To find the value for a given row, add the column values for each shaded square. In **Figure 1**, for example, the top row has only the third square shaded, so its row value is 4. The fifth row has the first five squares shaded, so its row value is 31 ( $1 + 2 + 4 + 8 + 16$ ). Continue through your alphabet or symbol list and convert every object you draw into a sequence of eight row values, listing the top-row value first.

In **Listing 1**, the first DATA line has only a single entry that tells your Apple II the number of characters you'll define. The rest of the DATA lines each define a single character. Nine values are listed for each character. The first DATA value determines the RAM location where you'll store that character. The second through ninth values are the eight row values that define the character, as described above.

Although you could store this data in any RAM location that's not in use, I reserve the locations above 36000 by employing a HIMEM:36000 call at the start of the program. Because I'm storing data corresponding to alphabetic and keyboard characters, I list them in their ASCII code order; that way the computer can calculate the starting memory location for each character from its ASCII code. For the English and keyboard characters, the formula is  $Location = 36000 + 8 * (ASCII\ value - 32)$ . For the Russian characters, the formula is  $Location = 36760 + 8 * (ASCII\ value - 64)$ .

These formulas make calling up a character easy. You can also write a simple subroutine to have the Apple II calculate a character's location and display the character at a designated spot on screen automatically. (See **Listing 2**.)

By using HIMEM:36000, your Apple II will store all program variables below 36000 — the only concern you have is keeping your program from growing too

large. If you need to, you can make appropriate adjustments in these values to get everything to fit into memory. Just be sure to change the location formulas to match your choice of value for HIMEM.

### POKEING DATA INTO RAM

**Listing 1** is basically a subroutine (lines 1200–1245) that READs each character's DATA statement, calculates the proper RAM location, and POKEs in the eight row values that follow. For each character, your Apple II reads the memory-location index as M, then uses a loop (FOR J=0 TO 7) to read each of the row values, and POKEs these values into RAM locations calculated as  $36000 + M + J$ . Because the values for M in each DATA statement increment by eight, no two characters will occupy the same area of RAM. As written, **Listing 1** has 128 total characters. If you want to use only the English and keyboard characters, change line 1300 to DATA 95 and delete lines 1795 to 1955. You can reduce **Listing**

1 further by changing line 1300 to DATA 64 and deleting lines 1625 to 1790 if you don't need lowercase letters.

You could include **Listing 1** in your graphics program as a subroutine, but this would waste a lot of space. Because the character POKEd into RAM will stay there until you turn off the computer, you might prefer to keep **Listing 1** separate and run it before your graphics programs. You can then chain from this program into your first graphics program, making it seem as if there's only one. **Listing 1** connects to a second program at line 40 with a PRINT CHR\$(4); "RUN RUSSIAN ONE" command. Be sure to use RUSSIAN ONE as the file name for **Listing 2** if this feature is to operate as written.

### DISPLAYING THE CHARACTERS

**Listing 2** demonstrates how to display these graphics characters in the graphics window. (You must run **Listing 1** before executing **Listing 2**, though. And if you've

shortened **Listing 1**, the undefined characters will appear as meaningless smudges on screen when you call them.) When you run **Listing 2**, the computer draws two pictures and labels them in English and Russian. Then it displays two simple Russian sentences along with their English translation and a pronunciation guide (in lowercase) to the Russian words.

First, we must retrieve the bit maps from memory, then we can worry about placing them on the graphics screen. You must assign each word or phrase you want to display in the graphics window to the string variable, Z\$; each object must correspond to a keyboard character. The retrieval subroutine begins with lines 900 and 905 of **Listing 2**; at this location set K, the character-set flag, to either 0 or 1 depending on whether you want English or Russian characters, respectively. We also set the blank flag, B, to 0. If BK=0, and the character you send is "space" (ASCII 32), line 916 will skip the part of the

**Listing 1. HI-RES CHARACTERS.** This program POKEs English upper- and lowercase characters, keyboard symbols, and Russian uppercase characters into RAM, then chains into the program RUSSIAN ONE (**Listing 2**).

```

1 REM HIRES CHARACTERS
2 REM BY DAN BISHOP
3 REM A+ INCIDER
4 REM ****
5 REM THIS UTILITY POKEs CHAR-
6 REM ACTERS & SYMBOLS DEFINED
7 REM IN THE DATA STATEMENTS
8 REM INTO RAM FOR HIRES USE.
9 REM ****
10 HIMEM: 36000
11 HOME
12 VTAB 12
25 PRINT "LOADING CHARACTER DEFINITIONS INTO RAM."
30 GOSUB 1200
35 PRINT : PRINT "FINISHED."
40 PRINT CHR$(4); "RUN RUSSIAN.ONE"
100 END
1200 READ N
1205 FOR I = 1 TO N
1210 VTAB 15: PRINT "WORKING ON CHARACTER "I" OUT OF "N"."
1215 READ M
1220 FOR J = 0 TO 7
1225 READ C
1230 POKE 36000 + M + J,C
1235 NEXT J
1240 NEXT I
1245 RETURN
1300 DATA 128
1305 DATA 0,0,0,0,0,0,0,0: REM BLANK
1310 DATA 8,4,14,14,4,0,4,4,0: REM !
1315 DATA 16,10,10,0,0,0,0,0,0: REM "
1320 DATA 24,10,10,31,10,31,10,10,0: REM #
1325 DATA 32,4,30,5,14,20,15,4,0: REM $

```

**Listing 1. (Continued)**

```

1330 DATA 40,3,19,8,4,2,25,24,0: REM %
1335 DATA 48,2,5,5,2,21,9,22,0: REM &
1340 DATA 56,4,4,4,0,0,0,0,0: REM '
1345 DATA 64,4,2,1,1,1,2,4,0: REM (
1350 DATA 72,4,8,16,16,16,8,4,0: REM )
1355 DATA 80,4,21,14,4,14,21,4,0: REM *
1360 DATA 88,0,4,4,31,4,4,0,0: REM +
1365 DATA 96,0,0,0,0,8,8,4,0: REM COMMA
1370 DATA 104,0,0,0,31,0,0,0,0: REM -
1375 DATA 112,0,0,0,0,0,0,4,0: REM PERIOD
1380 DATA 120,0,16,8,4,2,1,0,0: REM /
1385 DATA 128,14,17,17,17,17,14,0: REM 0
1390 DATA 136,4,6,4,4,4,4,14,0: REM 2
1395 DATA 144,14,17,16,16,12,3,31,0: REM 2
1400 DATA 152,15,16,16,12,16,16,15,0: REM 3
1405 DATA 160,12,10,9,9,31,8,8,0: REM 4
1410 DATA 168,31,1,1,15,16,16,15,0: REM 5
1415 DATA 176,30,1,1,15,17,17,14,0: REM 6
1420 DATA 184,31,8,4,2,1,1,1,0: REM 7
1425 DATA 192,14,17,17,14,17,17,14,0: REM 8
1430 DATA 200,14,17,17,30,16,8,7,0: REM 9
1435 DATA 208,0,0,4,0,4,0,0,0: REM :
1440 DATA 216,0,0,4,0,4,4,2,0: REM ;
1445 DATA 224,16,8,4,2,4,8,16,0: REM <
1450 DATA 232,0,0,31,0,31,0,0,0: REM =
1455 DATA 240,2,4,8,16,8,4,2,0: REM >
1460 DATA 248,14,17,8,4,4,0,4,0: REM ?
1465 DATA 256,14,17,21,29,13,1,30,0: REM @
1470 DATA 264,4,10,17,17,31,17,17,0: REM A
1475 DATA 272,15,17,17,15,17,17,15,0: REM B
1480 DATA 280,14,17,1,1,1,17,14,0: REM C
1485 DATA 288,15,17,17,17,17,17,15,0: REM D
1490 DATA 296,31,1,1,7,1,1,31,0: REM E
1495 DATA 304,31,1,1,7,1,1,1,0: REM F

```

# APPLESOFT ADVISER

## **Listing 1. (Continued)**

```

1500 DATA 312,14,17,1,1,29,17,30,0: REM G
1505 DATA 320,17,17,17,31,17,17,17,0: REM H
1510 DATA 328,14,4,4,4,4,4,14,0: REM I
1515 DATA 336,28,8,8,8,8,9,6,0: REM J
1520 DATA 344,17,9,5,3,5,9,17,0: REM K
1525 DATA 352,1,1,1,1,1,1,31,0: REM L
1530 DATA 360,17,27,21,17,17,17,17,0: REM M
1535 DATA 368,17,17,19,21,25,17,17,0: REM N
1540 DATA 376,14,17,17,17,17,17,14,0: REM O
1545 DATA 384,15,17,17,15,1,1,1,0: REM P
1550 DATA 392,14,17,17,17,21,9,22,0: REM Q
1555 DATA 400,15,17,17,15,5,9,17,0: REM R
1560 DATA 408,14,17,1,14,16,17,14,0: REM S
1565 DATA 416,31,4,4,4,4,4,4,0: REM T
1570 DATA 424,17,17,17,17,17,17,14,0: REM U
1575 DATA 432,17,17,27,10,14,4,4,0: REM V
1580 DATA 440,17,17,17,17,21,27,17,0: REM W
1585 DATA 448,17,27,14,4,14,27,17,0: REM X
1590 DATA 456,17,17,10,4,4,4,4,0: REM Y
1595 DATA 464,31,16,8,4,2,1,31,0: REM Z
1600 DATA 472,7,1,1,1,1,1,7,0: REM LEFT BRACKET
1605 DATA 480,0,1,2,4,8,16,0,0: REM BACK SLASH
1610 DATA 488,28,16,16,16,16,16,28,0: REM RIGHT BRACKET
1615 DATA 496,4,10,17,0,0,0,0,0: REM CARROT
1620 DATA 504,0,0,0,0,0,0,31: REM UNDERLINE
1625 DATA 520,0,0,14,16,30,17,30,0: REM a
1630 DATA 528,1,1,15,17,17,17,15,0: REM b
1635 DATA 536,0,0,30,1,1,1,30,0: REM c
1640 DATA 544,16,16,30,17,17,17,30,0: REM d
1645 DATA 552,0,0,14,17,31,1,30,0: REM e
1650 DATA 560,12,18,2,15,2,2,2,0: REM f
1655 DATA 568,0,0,14,17,17,30,16,14: REM g
1660 DATA 576,1,1,15,17,17,17,17,0: REM h
1665 DATA 584,4,0,6,4,4,4,4,14,0: REM i
1670 DATA 592,8,0,12,8,8,8,9,6: REM j
1675 DATA 600,1,1,9,5,3,5,9,0: REM k
1680 DATA 608,6,4,4,4,4,4,14,0: REM l
1685 DATA 616,0,0,27,21,21,21,17,0: REM m
1690 DATA 624,0,0,15,17,17,17,17,0: REM n
1695 DATA 632,0,0,14,17,17,17,14,0: REM o
1700 DATA 640,0,0,15,17,17,15,1,1: REM p
1705 DATA 648,0,0,30,17,17,30,16,16: REM q
1710 DATA 656,0,0,29,3,1,1,1,0: REM r
1715 DATA 664,0,0,30,1,14,16,15,0: REM s
1720 DATA 672,2,2,15,2,2,18,12,0: REM t
1725 DATA 680,0,0,17,17,17,25,22,0: REM u
1730 DATA 688,0,0,17,17,17,10,4,0: REM v
1735 DATA 696,0,0,17,17,21,21,27,0: REM w
1740 DATA 704,0,0,17,10,4,10,17,0: REM x
1745 DATA 712,0,0,17,17,17,30,16,14: REM y
1750 DATA 720,0,0,31,8,4,2,31,0: REM z
1755 DATA 728,28,6,6,3,6,6,28,0: REM {
1760 DATA 736,4,4,4,4,4,4,4: REM |
1765 DATA 744,7,12,12,24,12,12,7,0: REM }
1770 DATA 512,62,65,85,65,85,93,65,62: REM HAPPY FACE
1775 DATA 752,62,65,85,65,65,93,85,62: REM FROWN FACE
1795 DATA 760,30,17,17,30,20,18,17,0: REM YAH
1800 DATA 768,4,10,17,17,31,17,17,0: REM AH
1805 DATA 776,31,1,1,15,17,17,15,0: REM BAY
1810 DATA 784,17,17,17,30,16,16,16,0: REM CHAY
1815 DATA 792,14,10,10,10,10,31,17,0: REM DAY
1820 DATA 800,31,1,1,7,1,1,31,0: REM YAY
1825 DATA 808,4,14,21,21,21,14,4,0: REM EF
1830 DATA 816,31,1,1,1,1,1,1,0: REM GAY
1835 DATA 824,0,17,17,17,23,21,23,0: REM YERRI
1840 DATA 832,17,17,25,21,19,17,17,0: REM EE
1845 DATA 840,73,42,42,28,42,42,73,0: REM ZHAY
1850 DATA 848,17,9,5,3,5,9,17,0: REM KAH
1855 DATA 856,28,20,20,20,20,21,23,0: REM EL
1860 DATA 864,17,27,21,17,17,17,17,0: REM EM

```

## **Listing 1. (Continued)**

```

1865 DATA 872,17,17,17,31,17,17,17,0: REM EN
1870 DATA 880,14,17,17,17,17,17,14,0: REM OH
1875 DATA 888,31,17,17,17,17,17,17,0: REM PAY
1880 DATA 896,17,17,21,21,21,63,48: REM SHCHAH
1885 DATA 904,15,17,17,15,1,1,1,0: REM EHR
1890 DATA 912,14,17,1,1,1,17,14,0: REM ES
1895 DATA 920,31,4,4,4,4,4,4,0: REM TAY
1900 DATA 928,29,21,21,23,21,21,29,0: REM YOU
1905 DATA 936,15,17,17,15,17,17,15,0: REM VAY
1910 DATA 944,17,17,21,21,21,21,31,0: REM SHAH
1915 DATA 952,17,27,14,4,14,27,17,0: REM KHAKH
1920 DATA 960,17,17,18,20,12,4,3,0: REM OOH
1925 DATA 968,14,17,16,12,16,17,14,0: REM ZAY
1930 DATA 976,0,1,1,1,15,9,15,0: REM M.ZNAKH
1935 DATA 984,14,17,16,30,16,17,14,0: REM EBOROTNOE
1940 DATA 992,0,3,2,2,14,10,14,0: REM T.ZNAKH
1945 DATA 1000,10,4,17,25,21,19,17,0: REM EKRATKOE
1950 DATA 1008,10,0,31,1,15,1,31,0: REM YOH
1955 DATA 1016,17,17,17,17,17,17,63,48: REM TSEH

```

## **Listing 2. RUSSIAN ONE.** A beginning Russian-language lesson that illustrates the mixing of English and Russian graphics characters with hi-res graphics.

```

1 REM RUSSIAN ONE
2 REM BY DAN BISHOP, APPLESOFT ADVISOR
3 REM A+ INCIDER, MARCH 1991
4 REM ****
5 REM
10 HIMEM: 36000
15 HGR2 : HCOLOR= 7
20 GOSUB 1200: GOSUB 1100
25 GOSUB 1000: GOSUB 1100
30 TEXT : HOME
99 END
889 REM
890 REM ****
891 REM ROUTINES TO PEEK AND
892 REM POKE CHARACTERS
893 REM FROM RAM. ENGLISH
894 REM CHARACTERS USE K=0 AND
895 REM RUSSIAN CHARACTERS
896 REM USE K=1
897 REM ****
898 REM
900 K = 0:BK = 0: GOTO 910
905 K = 1:BK = 0: GOTO 910
910 FOR R = 1 TO LEN (Z$)
915 Z% = ASC ( MID$ (Z$,R,1))
916 IF Z% = 32 AND BK = 0 GOTO 950
920 KZ = 64:KL = 760: IF Z% < 64 OR K = 0 THEN KZ = 32:KL = 0
925 Z = 8 * (Z% - KZ)
930 FOR RJ = 0 TO 7
935 RV = PEEK (36000 + KL + Z + RJ)
940 POKE L + 1024 * RJ,RV
945 NEXT RJ
950 L = L + 1
955 NEXT R
960 RETURN
990 FOR I = 1 TO 1000: NEXT
995 RETURN
996 REM ****
997 REM 2 RUSSIAN SENTENCES
998 REM ****
1000 Z$ = "I AM WORKING AT THE FACTORY."
1005 L = 16384: GOSUB 900
1010 Z$ = "@ RABOTAU NA ZAVODE.

```

## Listing 2. (Continued)

```

1015 L = 16640: GOSUB 905
1020 Z$ = "yah rah.boh.tah.you nah zah.voh.dyeh"
1025 L = 16768: GOSUB 900
1030 HPLOT 0,39 TO 279,39
1040 Z$ = "NO ONE IS AT HOME."
1045 L = 16464: GOSUB 900
1050 Z$ = "NIKTO NE DOMA."
1055 L = 16720: GOSUB 905
1060 Z$ = "neek.toh nee doh.mah"
1065 L = 16848: GOSUB 900
1070 RETURN
1095 REM ****
1096 REM PAUSE/CONTINUE PROMPT
1097 REM ****
1100 Z$ = "PRESS ANY KEY TO CONTINUE.."
1105 L = 17367: GOSUB 900
1110 HPLOT 40,183 TO 240,183 TO 240,191 TO 40,191 TO 40,183
1115 GET A$
1120 Z$ =
1125 L = 17360:BK = 1: GOSUB 910
1130 BK = 0
1135 RETURN
1195 REM ****
1196 REM GRAPHICS AND TWO
1197 REM RUSSIAN NOUNS
1198 REM ****
1200 HPLOT 25,80 TO 140,80 TO 140,110 TO 25,110 TO 25,80
1205 HPLOT 60,80 TO 60,45 TO 75,45 TO 75,80
1210 HPLOT 90,80 TO 90,55 TO 105,55 TO 105,80
1215 FOR X = 30 TO 135 STEP 5
1220 FOR Y = 85 TO 105 STEP 5: GOSUB 1290
1225 NEXT Y,X
1230 HPLOT 200,93 TO 200,110 TO 240,110 TO 240,93
1235 HPLOT 195,95 TO 220,85 TO 245,95
1240 HPLOT 210,110 TO 210,98 TO 215,98 TO 215,110
1245 HPLOT 220,105 TO 220,98 TO 235,98 TO 235,105 TO 220,105
1250 Z$ = "FACTORY HOME"
1255 L = 17280: GOSUB 900
1260 Z$ = "ZAVOD DOM"
1265 L = 16424: GOSUB 905
1270 Z$ = "zah.vohd dohm"
1275 L = 16552: GOSUB 900
1285 RETURN
1290 HPLOT X,Y TO X + 2,Y TO X + 2,Y + 2 TO X,Y + 2 TO X,Y
1299 RETURN

```

subroutine that prints to the screen, increment the screen-location variable, L, and continue to the next character. This feature speeds up displays that have a lot of blanks, and will also prevent blank spaces from erasing any underlying graphics displays. If you want to erase some text during your program, however, you can set BK=1 and your Apple II will print a blank space, erasing whatever was at that location originally.

Lines 910 and 915 calculate the ASCII value of the character in Z\$ that you're printing currently to the screen. Line 920 sets KZ and KL for either the Russian (64

and 760) or English (32 and 0) character set. Line 925 derives the character number from its ASCII code, and lines 930 through 945 read eight successive row values and POKE them into the graphics-screen location designated by L. Because each row of pixels in one character is separated from the next row by 1024, the screen locations are calculated as  $(L+1024 \cdot RJ)$ , where RJ cycles from 0 to 7. (See Figure 3.) Line 950 increments L, the screen-location variable, and line 955 sends us back to get another character from Z\$ and do it all over again.

When your computer is finished

## Column Values

1	2	4	8	16	32	64	Row Values
4							
10							
17							
17							
31							
17							
17							
0							

Figure 1. Blocking out objects in a 7-column-by-8-row grid and calculating the eight row values for the defined object.

65	А	А	75	К	К	85	Х	Х
66	Б	Б	76	Л	Л	96	Ц	~
86	В	В	77	М	М	67	Ч	С
71	Г	Г	78	Н	Н	87	Ш	W
68	Д	Д	79	О	О	81	Щ	Q
69	Е	Е	80	П	П	93	б	!
95	З	З	82	Р	Р	72	bl	H
74	Ж	Ж	83	С	С	91	б	I
90	З	з	84	Т	Т	92	Э	Y
73	И	и	89	Ү	Ү	85	Ю	U
94	Й	й	70	Ф	Ф	64	Я	@

Figure 2. The ASCII values for the Russian characters defined in Listing 1 and their keyboard equivalents.

8192							
9216							
10240							
11264							
12288							
13312							
14336							
15360							

Figure 3. Actual RAM addresses for each row value.

displaying one character, L is incremented and the program cycles back to line 910 to pick out the next character in Z\$. You can define as many different sets of characters as you want. Each character must correspond to a keyboard character (upper- or lowercase.) To display that character, you must assign its keyboard symbol to Z\$, give an appropriate value to L for the screen location, and execute a GOSUB to call the display routine.

As with lines 900 and 905, the first line in this subroutine must assign appropriate values to a character-set flag, K, and the blank flag, BK. You must define KZ and

**Screen locations for first square in row.**

Page 1	Page 2	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39				
8192	16384																																												
8320	16512																																												
8448	16640																																												
8576	16768																																												
8704	16896																																												
8832	17024																																												
8960	17152																																												
9088	17280																																												
9216	16424																																												
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9728	16936																																												
9856	17064																																												
9984	17192																																												
9128	17320																																												
9256	16464																																												
9384	16592																																												
9512	16720																																												
9640	16848																																												
9768	16976																																												
9896	17104																																												
9984	17232																																												
9168	17360																																												

**Figure 4. RAM location values in pages 1 and 2 of hi-res graphics to be used for POKEing objects (such as alphabetic characters and symbols) onto the graphics screens. Values shown are the first of 40 successive location values for each of the 24 rows. Each square is seven by eight pixels, as shown in Figure 3.**

KL before line 925 in the subroutine (based on the value given to K), so that the program can refer to the correct character set. For example, the first Russian character has ASCII code 65 and is stored at location 36760, so I set KZ to 64 ( $65 - 64 = 1$ , the first character) and KL to 760. The rest of the lines in the subroutine stay the same for all character sets. Figure 2 shows the keyboard equivalent for the Russian character set. I tried to follow phonetic equivalents where possible; thus the Russian symbols H, P, and B are assigned to keys N, R, and V.

The one remaining task you must deal with is calculating L, the on-screen position where you'll place the first character in Z\$. There are 24 rows of 40 blocks each, into which you can display characters. The first row begins at location 8192 and ends at location 8231 in page 1, and begins at location 16384 and ends at location 16424 in page 2. The next seven rows are incremented from these values by 128 bytes per row. So for page 1, the second row uses locations 8320–8359, the third row uses locations 8448–8487, and so on. Rows 9–16 comprise a second section, and are offset from the first section by 40. Row 9 begins at 8232 (8192 + 40). Row 10 is 128 bytes away from row 9, beginning at 8320.

Finally, rows 17–24 fill another section, and are offset from the first set of values by 80. (Figure 4 illustrates these anomalies and will help you determine the values you should use for L.)

There are two drawbacks to using this approach for text-character representation that you won't find with shape tables. The first is that the blocks your characters occupy can't be smaller than the seven-by-eight-pixel grid, and they must always be positioned rigidly on screen in the standard 40-column-by-24-row text matrix — you can't overlap them in any way. This requirement doesn't apply to shapes, which can overlap, be any size, and start at any desired pixel location.

The second restriction applies only if you're defining objects larger than the seven-by-eight pixel grid by using two or more adjacent grids, and you want your program to calculate relative locations for the grids automatically. If one grid appears above the second grid, your program must take into account the three-cycle pattern for screen locations shown in Figure 4. As long as both grids are displayed within the same cycle, the lower grid's location is simply 128 more than that of the upper grid. If the two grids fall into two different cycles, however, the

calculation to determine the location of the second grid must take this into account.

This column concludes a six-part series on using Applesoft BASIC to program graphics images. We've discussed POKEing symbols into both low-resolution and high-resolution screens and using shape tables in high-resolution graphics. We've also learned to program around the high-resolution graphics windows and to use text-and-graphics mode with the high-resolution page 2 graphics screen. (Several examples of animation were included as well.) Once you begin to feel comfortable using these techniques, your imagination can provide the seeds for some truly remarkable graphics programming. □

### EDITORS' NOTE

Dan Bishop is making his last six columns on programming graphics images available in hardcopy and on floppy disk. Send \$19.50 and a 5.25-inch disk (initialized for DOS 3.3 or formatted for ProDOS) to Dan Bishop at the address below. Disks also include copies of the example programs in the series along with Disk Index Selector and Color Code Combo, a Mastermind-type game.

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# REVIEWS

Continued from p. 31

contestants must meet the challenges of all nine layouts to win.

Each game of Tesserae is actually a puzzle. Play begins on a board filled completely with tiles. Challengers try to solve the puzzle by clearing the pieces in as few moves as possible. Only one tile should remain by game's end.

Tesserae is easy to play, but difficult to win. The game features three types of tiles: *primary* (yellow, blue, or red), *secondary* (green, gold, or pink) and *tertiary* (gray). On black-and-white screens, it's simple to distinguish one tile from the next by the geometric pattern on its face. *Primary* tiles display a cross, square, or circle. Secondary tiles, which combine two primary tiles, have a cross in a square, a cross in a circle, or a circle in a square. A tertiary tile incorporates all three primary tile patterns. The software generates a random assortment of tiles according to the difficulty level you've selected. Beginner-level mosaics

typically have one secondary tile for every three primary tiles. Intermediate-level game boards include one secondary tile for each primary tile. Advanced games feature three secondary tiles for every five primary tiles, with a few tertiary tiles thrown in just to spice up the action.

Players clear the board by jumping tiles. Unlike checkers, Tesserae tiles can jump horizontally, vertically, or diagonally. When a primary tile jumps another primary tile and lands on an empty square, it leaves two empty spaces behind. But, because secondary and tertiary tiles are "combinations," they require more than one jump to remove. Jumping a tertiary tile produces a secondary, and jumping a secondary produces a primary. You can also create higher-level tiles by landing one tile on top of another. If all this sounds confusing, don't panic. Position the cursor over a tile and you can tell if it's movable. Although you must decide the best of all possible moves, Tesserae offers clues. If a tile is movable,

the cursor changes from a hand-shaped to a cross-shaped pointer. When you click on a movable tile, Tesserae points out the squares to which you can move the tile legally.

In addition to hints on moving, Tesserae features 26 screens of detailed on-line instructions, complete with demonstrations. You can read the instructions in sequence, or proceed directly to a particular topic by selecting it from the *Table of Contents*. The documentation is well written and easy to follow, and you can access it before or during game play.

## BUILT FOR COMFORT

The author provides several nifty options to increase Tesserae's "playability." You can face challenges with or without music and sound effects; decide whether or not to listen to the sound of tiles clicking as you move the mosaics from the board; and determine the speed at which the tiles flip (fast, slow, or no flip) during play. These effects give the game 3-D appeal.

Also, a special option directs the program to shift into "boss alert" (screen-saver) mode. Pressing Command-H initiates the screen saver, effectively hiding game play from view. When the coast is clear, press any key on the keyboard to resume play exactly where you left off. Save the current game and open it later at a more convenient time.

Tesserae is so appealing that you'll play for hours without becoming bored. The puzzles pit mind against matter, brain against board, and intellect against tile. This electronic amusement shares much in common with other popular strategy games, such as Spectrum HoloBytes' Tetris, Faces, and Welltris — there's more to winning than simply "boom and doom."

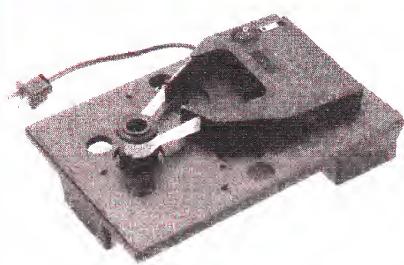
Yet, unlike the games from Spectrum HoloByte, Tesserae plays without a clock. You can take all the time you need to solve the puzzles, undoing as many moves as necessary to come up with the most elegant solution. Solve a puzzle and you're rewarded with an amusing display of animated tiles and electronic pyrotechnics. If you're looking for a great way to relax after a hard day's work, Tesserae may be the perfect escape (next to ice cream). It not only sharpens the mind, it's also low in calories!

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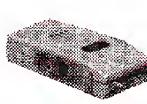
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If your elementary or middle-school writing class has been sluggish lately, Orange Cherry Software may have just the elixir — Children's Newspaper Maker. Despite its quirks, this desktop-publishing program for kids aged 8 to 12 can entertain youngsters while it helps them overcome writer's block.

Children's Newspaper Maker offers three levels of interaction for student pensmiths. In Level 1 children prepare the 11 parts of an imaginary newspaper by clicking on each of the newspaper sections — *Newspaper Title, Your Name, The Date, Weather, Earth and Health News, World News, School News, Sports, Movie Reviews, Funny Lifestyles, and Travel Notes* — and selecting the items they want to include. In *Newspaper Title*, for example, kids can choose one of four beautiful banners.

Although the first level doesn't let students write or edit news articles, it's an entertaining, interactive tutorial that familiarizes children with the mouse, and teaches them newspaper anatomy by example — not by lecture.

Each finished publication — a two-page, two-column newspaper — looks good, particularly when it's printed in full color on an ImageWriter II. Given the many possible choices in each newspaper section, every child in your class can prepare his or her own unique, personalized tabloid.

Levels 2 and 3 build on Level 1's newspaper construction-set approach. They offer progressive degrees of freedom and challenge, by encouraging kids to edit stories and compose their own eventually. Students load story-starter *News Sheets*, then edit or finish them with their own words. Ready-made *News Sheets* cover topics such as community news, conservation, feature stories, leisure news, school news, science, weather, and world events. Using canned news is as easy as pulling down the *File* menu, selecting *Load Sheet*,

and choosing the desired topic from the standard file directory that appears on screen. Double-click the name of the file or click on the file and the *Open* button.

It takes a little practice to become proficient in manipulating text frames, or "blocks" as the program calls them. When you click on a story in a canned news sheet, a flashing border appears. Conventional desktop-publishing programs offer tools such as the I-beam for editing text.

Probably for simplicity's sake, Children's Newspaper Maker doesn't; instead it requires a child to choose *Edit Text* from the menu. Only rudimentary word-processing features are available. There are no spell-checker or text-justification options, and you can't select text for removal by dragging with the mouse and invoking a *Cut* command. Nor are there any alternate keyboard commands for speeding up your work.

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## REVIEWS

Both Levels 2 and 3 feature some authentic GS features such as pull-down menus (*Apple, File, Edit, Fonts, and Special*) and dialog boxes — but no scroll bars. The full width of each newspaper page appears on screen; press the up- and down-arrow keys to scroll vertically. The program's 15-page manual doesn't seem to document this feature; I discovered this detail, as well as a few other Children's Newspaper Maker fine points, by sheer dumb luck. Taking all this into consideration, the program's manual commits too many sins of omission for it to receive a passing grade.

### STOP THE PRESSES

You can save finished news sheets with unique names on data disks formatted with Children's Newspaper Maker. During one Level 2 work session, however, the *Format a Disk* option remained dimmed. When I switched to Level 3 the option was activated.

The design of the disk-formatting dialog box isn't standard, but you'll be able to live with that. What you won't be able to live with is a disk formatter that doesn't warn you when you're about to initialize a disk that contains data. The software's unacceptable error-handling features, including the program's failure to warn you about saving a news sheet before beginning another one, also receive a failing grade.

When your students begin to perform more than just minor editing of canned news sheets, they're probably ready to work with Level 3. Offering virtually identical features, Level 2 and Level 3 are different more in concept than in reality. At either level you can load canned news sheets or create new ones from scratch.

Choose the *New Sheet* option (*File* menu) and draw new text and graphics frames. Placing a new frame is a snap: Just click on the page location where you want the object to appear. Use selection handles to position and enlarge each frame.

Be warned: Reckless clicking creates frames that when empty or unselected are

invisible and hinder the page-design process. For example, if you'd like to enlarge a text frame, other frames that get in the way can prevent you from doing so. Any invisible, impeding frame flashes briefly, however. Click on it (tricky sometimes because it "disappears" from view), pull down the *Edit* menu, and choose *Remove Item*. In general, page layout can be a klutzy proposition because Children's Newspaper Maker doesn't let you drag frames over other frames — so plan ahead.

If you'd like to import an illustration, simply create a graphics frame, pull down the *Edit* menu, and select *Load Graphic*. The program disk provides dozens of good-looking black-and-white clip-art graphics. You may have to nudge or resize other frames temporarily to place the illustration.

The manual announces in cavalier fashion that you can import graphics images created with other programs — but it doesn't specify the format. I imported super-hi-res graphics from PaintWorks Gold and GraphicWriter III, but I was unable to use AppleWorks GS images or double-hi-res graphics from Publish It! 4.

Whatever the native state of the art, Children's Newspaper Maker strips it of color. News sheets created with Level 2 and Level 3 are black-and-white-only, one-page documents. You have to collate or cut and paste printouts manually to create a full-fledged newspaper.

Like many Orange Cherry products, Children's Newspaper Maker is long on concept and short on actual performance. Incomplete documentation, poor error-handling, and bare-bones word-processing and page-layout capabilities cripple this program seriously. I relish the program's three-level approach to enticing kids to write, and hope that Orange Cherry Software will devote additional time to the unglamorous but crucial finishing touches that make a product a winner.

**Cynthia E. Field, Ph.D.**

**Wakefield, RI**



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## SUPER GS AWARD MAKER

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Award-design program; 768K Apple IIgs; \$49.95



**S**uper GS Award Maker is a software paradox. This program, which purportedly offers more than five dozen ready-made award designs, couldn't win an award itself. Although the inspiration behind the program is good, its execution keeps it at the bottom of the barrel.

Even the term "award" seems a little facetious. At least one-fifth of its documents aren't awards at all. Take the *Merry Christmas* and *Celebrate Flag Day* mini-posters in the *Holidays* folder, for example. Of the 12 more-or-less academic award topics, *Holidays* offers the largest number of choices with 14 designs in all. But ironically, they're not awards and you can't customize them.

Strip away the hyperbole and Super GS Award Maker is essentially a series of Apple Preferred Format paintings to which you can sometimes add the recipient's name and the recognition date. To its credit, the program offers sufficient room to type, even the longest name, but the name probably won't be centered on the line. Forget the usual font choices GS users enjoy — they're not available here. With Super GS Award Maker what you see is what you get — and what you get isn't much. For example, I discovered by trial and error



An award for any occasion.

that you must type dates in the format 8/3/91. You can't spell out the name of the month, and the program doesn't convert the 8 to August, either. Even some 8-bit programs do that automatically.

The program offers only a single blank award template — a glorified border on which you can type the recipient's name, the date, and one line of text for the award

title. All text — what little there is of it — is centered vertically and horizontally automatically. The overall effect is pretty stark. To make matters worse, the blank award's border is out of whack. At first look the obvious skewing of the top and bottom sections seems intentional, but measuring the left and right sides proves that they're simply "off."

Printing documents presents more disappointments. After producing a representative sample of awards on an ImageWriter II with a fresh color ribbon (you can also print in black-and-white), almost all yellow sections came out striped with red.

Super GS Award Maker isn't just impoverished in features and hampered in overall performance: Its error-handling abilities are the worst. For example, you can't access the *Quit* option (listed under the *File* menu) from the main-menu award screen. If you press the escape key to try to "back out," you see a directory with some indecipherable text. You may be able to recover, though, by clicking on the *Cancel* button. Once you've chosen an award and selected the *Enter Text* feature, you can't change your mind. You have to enter some keystrokes — even create a bogus award — before you can escape. Stopping the printer once it's begun is a challenge, too. Pressing the standard GS command Open apple-Period crashes the program. You'll wonder if the "Stupid System Error" message is your GS trying to tell you something.

Super GS Award Maker digresses too liberally from Apple's "Human Interface." While the menu bar looks standard, don't expect to find any quick-key alternate commands listed. Double-clicking on the desired award in the pop-up directory gets you nowhere fast: You have to click on the award's name, then on the rectangular *Load* button. And you couldn't save awards even if you wanted to. In fact, if you happen to pull down the *File* menu and choose *Enter Text*, you'll erase entries you typed previously. You probably don't want to create a series of awards for a whole class or extracurricular club this way.

The program's Flag Day "award" betrays a lot about the software's general lack of attention to detail. Seven stripes and 44 stars? You'd be better off buying yourself a ruler and a good set of markers instead. □

**Cynthia E. Field, Ph.D.**

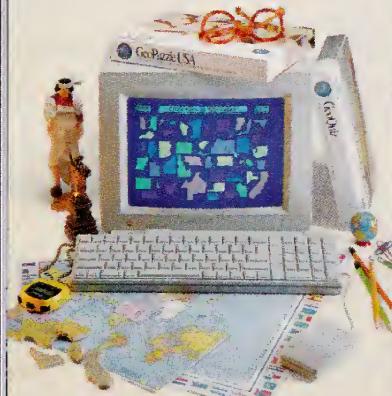
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## HINTS

# WORDS TO THE WISE

**A definition here, a shortcut there — our information swap can help you stay one step ahead of frustration.**

By THE STAFF OF INCIDER/A+

### ROM AND OPERATING SYSTEMS

It's *inCider/A+* to the rescue as we define two more basic computing terms. With a little help from Gus (last month's visual aid), we're going to discuss *read-only memory* (ROM) and *operating systems* (OS). When we last saw our hero, he was standing in the middle of a library, acting as your computer. (See "Potpourri of Tips," July 1991, p. 72.) His brain made a cameo appearance as random-access memory (RAM), and the library showed great depth in the part of your disk drive.

From that first meeting with Gus we know that he has a limited memory, and is good about following specific instructions. But do we know much else about him? Is he friendly? Is he easy to talk to? What makes Gus different from anyone else? These qualities, which we could call Gus' "personality," are determined by your computer's *read-only memory* (ROM). The instructions in ROM are etched permanently by the manufacturer and are the most basic instructions your computer has. They interact directly with the system hardware, including the microprocessor, the video display, and the keyboard. In Gus, these instructions would also control his breathing, heartbeat, and basic motor functions.

The Apple II series' ROM is a lot less comprehensive than the Macintosh's. The

first action an Apple II takes when you turn it on is to look for an operating system (librarian) and to load it from a hard- or floppy-disk drive. The *instructions* for loading the operating system are in ROM — not the operating system itself. If you turn on an Apple II without loading GS/OS or ProDOS, all you get is an Applesoft BASIC prompt. You can write programs, but you can't save them, nor can you load or execute any programs from disk. You don't get any mouse support or menus, either — just a blinking cursor and what programmers call a *command-line interface*, meaning you type commands by hand.

Apple IIs need programs to tell them how to do anything complex. Specifically, they need to load an operating system into memory in order to use a disk drive and execute programs. If Gus were like an Apple II, he'd know how to go into the library, but if there were no librarian (operating system) available, he couldn't get any books off the shelves.

Currently, the two most popular operating systems for the Apple II series are ProDOS (professional disk operating system) and GS/OS (GS operating system). GS/OS is a much friendlier librarian; Gus can just point to a book and GS/OS will take it off the shelf and open it for him. ProDOS is grumpier: Gus has to write down the exact name of a book and the shelf it's on, and if the book isn't exactly where Gus says it is, ProDOS will scream, "FILE NOT FOUND." On the other hand,

once you get to know ProDOS, writing a program for the "librarian" is much easier — GS/OS doesn't understand BASIC at all. Also, GS/OS won't even speak to Gus' little sisters (IIe, IIc, IIc Plus, II Plus, and II).

Gus' big brother, Mac (any Macintosh), doesn't use ProDOS or GS/OS. In fact, Mac doesn't even use the same libraries as Gus. With the help of a Macintosh program called *Apple File Exchange*, Mac and Gus can swap information, but they can't use each other's programs. In some ways, Mac is smarter than Gus, because he needs a librarian only for special tasks such as talking to a printer or communicating over a network, or if the library is especially big (like a hard disk). Mac has many routines and functions already in his ROM. But again, while Mac is friendlier, writing programs for him is also harder.

Next time — system extensions or "alphabet soup." — C.C.

### COMMAND PERFORMANCE

One of the neatest things I've found that you can do with *Microsoft Word* is define your own command keys and add commands that aren't shown ordinarily on the menus. If you choose *Commands* from the *Edit* menu, you get a dialog box with a scrolling list of every command available in Word. If you see a command you like, you can add it to any menu and assign it a command key. For instance, one of my favorite AppleWorks attributes is the ability to use the keyboard to move to the beginning or the end of my document. So in Word, I selected *Move to Start of Document*, chose the *Utilities* menu, and clicked on the *Append* button. Then I clicked on the *Add* button under *Keys* and typed *Command-1*. I repeated this process for *Move to End of Document*, but used *Command-9*. Now I can move to the beginning or end of my documents without having to use the mouse. — C.C.

## MACROBIOLOGY

While most of us learned French, German, or Spanish in high school, there were always the twisted few who embraced Pascal or Cobol, instead. While we were practicing "Buenos dias" and "Guten Tag," they were babbling on about nested loops.

Before macros were invented, you needed a degree in molecular keyboard physics to be a programmer. But not now. A macro is a series of commands you teach a program to execute at the touch of a key. Some programs have macros built in, and some let you create macros yourself. It isn't necessary to understand the basic structure of macros to use them, but it's helpful to know how one works if you intend to write your own.

Beagle Bros' *TimeOut UltraMacros* is a popular program that lets you create macros for AppleWorks. While the programming syntax may vary from program to program, here are a few basic macro concepts presented from the view of an UltraMacros user. Follow this syntax: oa = Open apple; sa = Solid apple (or Option); ba = both apples; ctrl = control key.

To "call" a macro from the keyboard, hold down the command key(s) and tap the character key with which it's combined. Here's a common "Add a file to the Desktop" macro: A:<all><oa-Q><esc><rtn><rtn>!

Let's define its parts:

- **A:** is the *macro token*, which identifies the keystroke that launches the macro. It's always followed by a colon (:). The solid-apple keypress is assumed and doesn't have to be written into the code.
- **<all>** is the *domain token*, which indicates from which modules of AppleWorks this macro can be called.
- **<oa-Q><esc><rtn><rtn>!** is the *command token*. A sequence of commands is always followed by a closing angled bracket (>) and an exclamation mark (!). This tells UltraMacros that the sequence has ended.

— Will Nelkin, San Rafael, CA,  
author of *ULTRA-AppleWorks*  
and *UltraAwesome Macros*

### MACRO TOKEN

With just a single character, angled brackets aren't required, but if you have a token with two or more characters you must embrace it with angled brackets. A single character always refers to a solid-apple keystroke combination <sa-A>. If you wanted to you could write it as: <sa-A><all><oa-Q><esc><rtn><rtn>!

This example isn't case sensitive. Except for a few "reserved macro tokens" (noted in the UltraMacros manual), you can combine any keyboard character with sa-, sa-ctrl-, ba-, or ba-ctrl- keystrokes, including the following command-key tokens:

<esc> — escape key (also <ctrl-[>)  
<tab> — tab key (also <ctrl-l>)  
<del> — delete key  
<rtn> — return key (or enter)  
(also <ctrl-M>)  
<spc> — spacebar  
<left> — left-arrow key (also <ctrl-H>)  
<right> — right-arrow key  
(also <ctrl-U>)  
<down> — down-arrow key (also <ctrl-J>)  
<up> — up-arrow key (also <ctrl-K>)

Most of the above list have control-key equivalents. (Be careful you don't duplicate these inadvertently.)

### DOMAIN TOKEN

<all> indicates functions in all AppleWorks and TimeOut modules.

<awp> indicates functions in the AppleWorks word processor only.

<adb> indicates functions in the AppleWorks database only.

<asp> indicates functions in the AppleWorks spreadsheet only.

<ato> indicates functions in a TimeOut module only (active in AppleWorks 2.0 and higher only).

<asr> indicates function only as a subroutine of another macro (active only in AppleWorks 3.0).

### COMMAND TOKENS

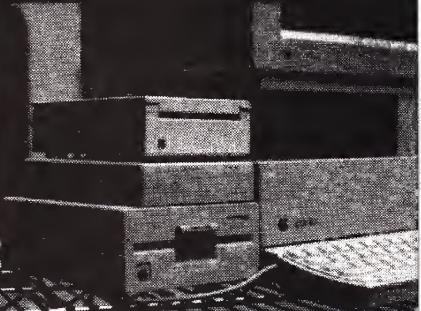
A command token may be an AppleWorks command, command key, or UltraMacros command. In our example, commands are separated by angled brackets (<>). This notation helps the novice user see individual commands at a glance. UltraMacros also permits commands to be separated by colons (:) if preferred, as here: <oa-Q : esc : rtn : rtn>!

You can separate most commands by spaces alone, but some require colons or angled brackets. (Consult the UltraMacros manual.) The colons and/or spaces between commands aren't included in the byte count by the macro compiler and may be used freely, as below, if it suits you: <oa-Q:esc rtn : rtn>!

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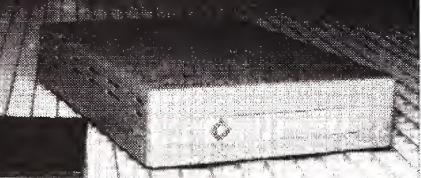


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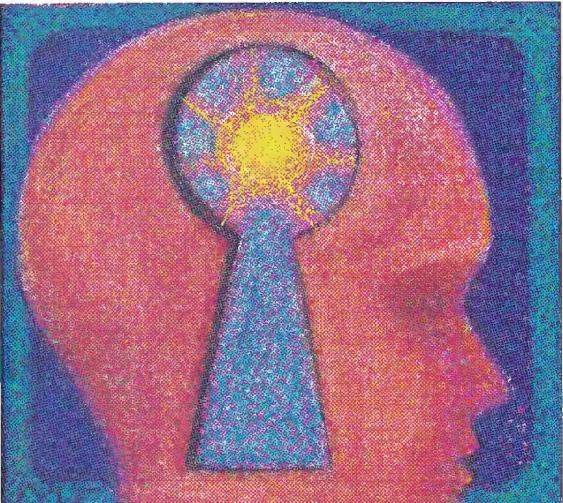
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## A REVOLUTION IN COMPUTER LITERACY

By DAVID D. THORNBURG, Ph.D.

In Victor Hugo's classic *Notre-Dame de Paris* (known familiarly as "The Hunchback of Notre Dame"), a memorable exchange takes place between the archdeacon and King Louis XI. The archdeacon is looking at a book created on the newly developed printing press and, pointing toward the cathedral, says, "Alas! This [the book] will kill that [the church]." Hugo explains that, until Gutenberg's time, architecture was the principal universal form of "writing." The expense of architecture ensured that its "stories"



were limited to those dictated by the people with the money or power to bring buildings into existence. With the invention of the printing press, the low cost of books enabled all to write and read. In Hugo's words: "The invention of printing was the greatest event in history. It was the parent revolution: It was the fundamental change in mankind's mode of expression . . . When put into print, thought is more imperishable than ever; it is volatile, intangible, indestructible; it mingles with the air. In the time of architecture, it became a mountain, and itself master of a century and a region. Now

it has been transformed into a flock of birds, scattering to the four winds and filling all air and space."

In this age, we're at the start of another revolution in the technology of expression and the gathering of information. Ten-year-old children sitting at their computers equipped with CD-ROM drives have at their fingertips more information than was available in the Vatican library at

the height of the Renaissance. Furthermore, they have faster access to this information and to searching and place-marking tools that enable them to explore a topic, make links at will, and then organize the information in a form that connects with their specific interests or tasks. In short, children can create meaning from information at the speed of thought.

While I believe the traditional book will survive into the foreseeable future, it will receive incredible pressure from our electronic media. This pressure will come from many sources. First, the cost of CD-ROM publishing is much less than the cost of book publishing. Second, CD-ROM-based material can be accessed quickly in numerous ways, ranging from free browsing to highly focused searches for specific information. In addition to the text and graphics found in books, CD-ROMs can contain animated sequences and computer programs, and they can provide an opportunity to interact with information in numerous ways. CD-ROMs are easy to handle, too — imagine a 21-volume encyclopedia on a little disc.

Just as audio CDs have displaced vinyl as the distribution medium for sound, CD-ROM will displace paper as the distribution medium for reference materials, manuals, and other "nonliterary" works. (Replacing the pleasure of reading books of fiction and literature and other works for which speed and ease of access aren't important is probably a lot further down the road, and is a debatable point, anyway, among book lovers.)

### THE POWER OF THE MEDIUM

It's interesting to speculate on the impact this medium — a \$2 disc with a capacity of 250,000 pages of text, 6000 graphics images, or 70 minutes of compressed video — will have on society. One can certainly claim that in that earlier information revolution Gutenberg was Luther's enabling force for the Reformation, just as the audio cassette tape enabled the overthrow of the Shah of Iran in our own time.

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# LEARNING CURVE

look around and see what's available. There's something for every taste and subject. The **Educorp** catalogue (800-843-9497) lists a variety of commercial and shareware collections for the Macintosh (CD-ROM development for the II is lagging behind), and new titles are coming out weekly. The **Audubon Birds of America** disc contains not only beautiful pictures, but high-quality recordings of bird calls. The **Electronic Map Cabinet** produces clean, professional maps of more than 80 percent of the populated United States. A similar catalogue is available from the **Bureau of Electronic Publishing** (800-828-4766).

Other discs provide courses in foreign languages, and the **Discis** collection contains wonderful applications based on favorite children's stories. (For more information see "Compact Discovery," April, p. 80, and May, p. 88, and "CD-ROM Comes of Age," May, p. 44.)

Even if the cost of providing Macs to all your students is prohibitive, there are some

solutions. If you already have a labful of Apple IIs, perhaps you could get a Mac-based CD-ROM system for information retrieval in the school library. Students working with disc-based encyclopedias can capture text, put it on a Mac disk, and use the Mac's Apple File Exchange utility to convert it to Apple II format.

The revolution is now. I envision the day when we might hold a CD-ROM disc in one hand and, pointing to a textbook, say, "This [the CD-ROM] will kill that [the textbook]." □

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### Wayzata Technology, Inc.

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(800) 735-7321  
(612) 447-7321  
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### The Voyager Company

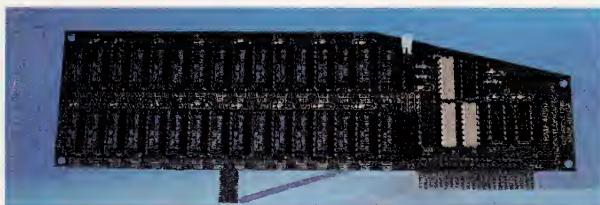
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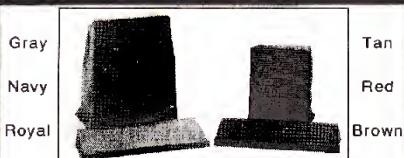
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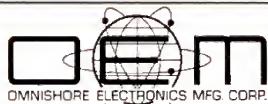
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# EDITORS' CHOICE

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Once in a while, you get to have some fun and do some good, too — dropping a bundle at a charity casino, pigging out on Girl Scout cookies, and now, playing Milestones 2000 on your IIgs. Milestones 2000 is a game that's fun to play, and the \$15 you pay for the pleasure of using it goes to help the homeless. When you pay your shareware fee to Ken Franklin, he passes it along to an organization that helps find homes for people who don't have them.

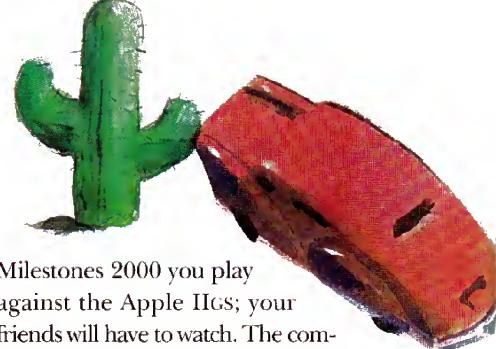
"You are blessed — you have an address, a roof, and a computer. Please help those who don't," states the game's on-screen message. If shareware rests on a hopeful notion that computer owners aren't bad people, "reliefware," as Franklin calls it, supposes that people are good and want to do good. Would you want to prove him wrong?

The goal of Milestones 2000 is to complete a 5000-kilometer trip by car. You progress by playing mileage cards, which come in denominations of 50, 100, 150, 200, and, for the reckless, 400 kilometers. Each stage of the route must encompass either 1500 or 2000 kilometers exactly.

(Math teachers might note that some calculation is asked of the player if this distance is to come out right.)

The IIgs will try to stop you by playing cards called "Out of Gas," "Crash," and other predictable road calamities. You impede the computer's progress in the same way, and in order to get rolling again, you (or the computer) need "Gas," "Repair," and other provident cards in your hand (or RAM).

You've probably played a game similar to Milestones; Milles Borne is a classic French card game you play against your friends. In



Milestones 2000 you play against the Apple IIgs; your friends will have to watch. The computer doesn't play too well, just well enough to make the game interesting. We developed a winning strategy without any great mental effort after playing a dozen games, but the element of chance keeps it interesting and fresh even when you know you can win consistently.

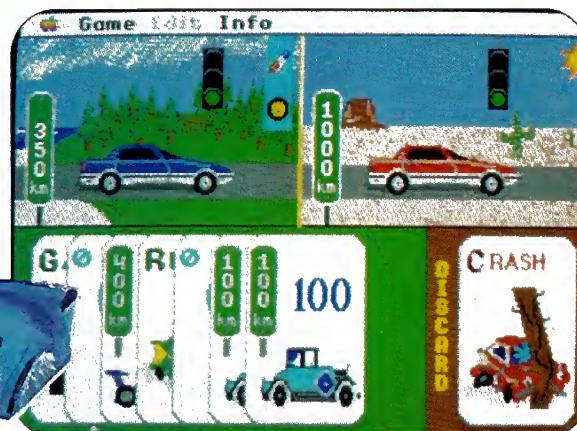


The sounds are witty — Franklin's kids cheer when you win, and the air whistles merrily when you play a "Flat." And the graphics are disarmingly cute, if not professionally animated multimedia. An accelerator helps — the Zip Chip or TransWarp variety, not the kind you keep your foot on.

Milestones 2000, written by an amateur programmer as shareware in ORCA Pascal, proves what we'd long suspected: The Apple interface and the modular Apple IIgs approach to programming enable people who never thought of themselves as programmers to write high-quality software. Milestones 2000 also proves what we'd hoped: Apple users care about the world beyond their computers.

Milestones 2000 is available where you find good shareware — from on-line networks, at user-group meetings, and from some distributors. (See "Shareware: Bargains You've Never Dreamed Of," June 1991, p. 35, for more information on this and other shareware programs.) You can try the game before you play, but even if you buy it from a distributor, you must send \$15 to Ken Franklin, 5603 81st Street East, Puyallup, WA 98371, if you want to keep it.

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Æ Conserver	\$77
Æ Power Supply IIe	\$78
Æ Power Supply GS	\$85
Æ PC Transporter	\$259
Æ PC Transporter GS Kit	\$36

### MACINTOSH SYSTEMS

Macintosh IIci 3/40 • 12" RGB Monitor & Keyboard, \$3429

Macintosh IIci 3/40 • 13" RGB Monitor & Ext. Keyboard, \$3869

Macintosh LC 2/40 • 12" RGB Monitor & Keyboard, \$2549

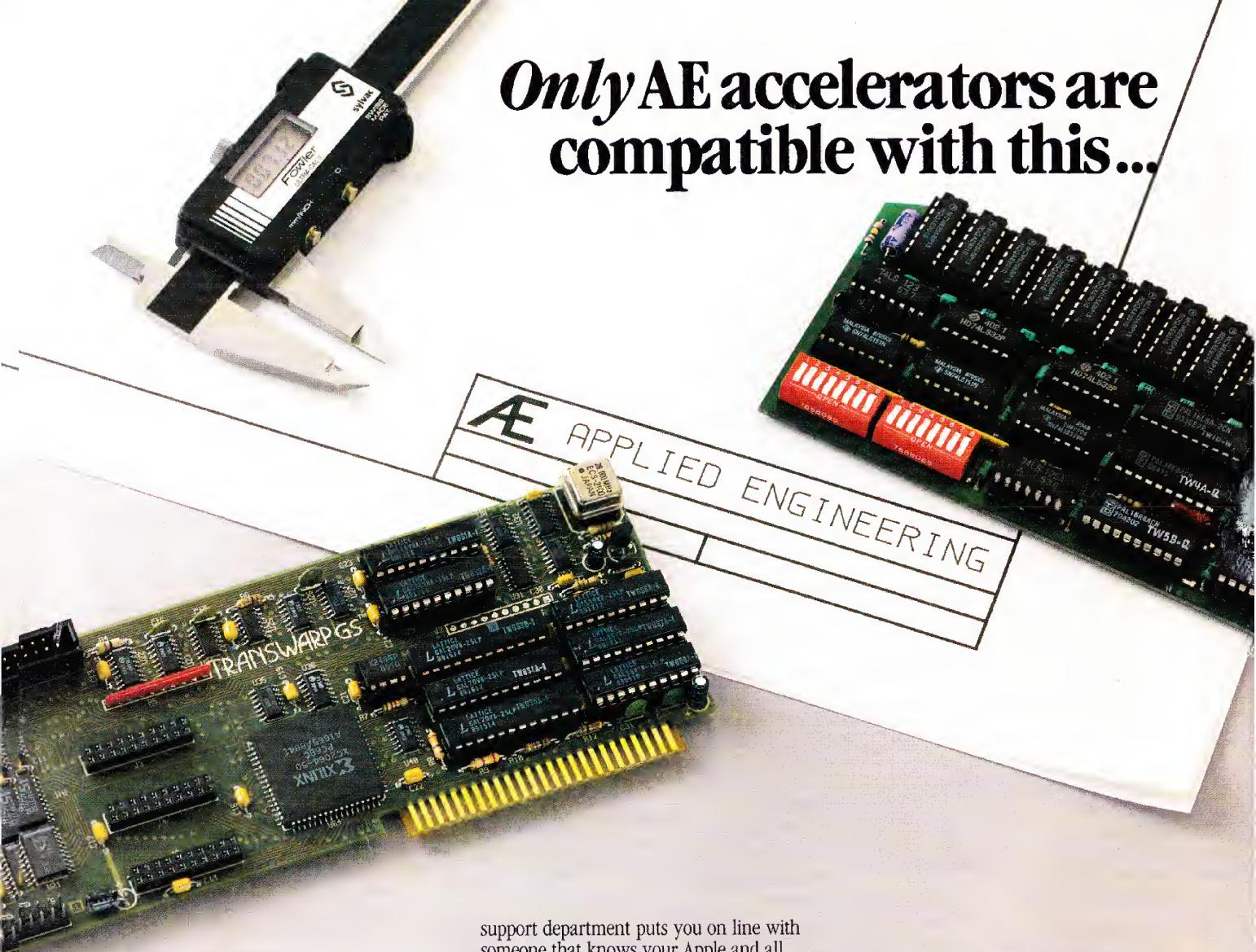
Macintosh IIci 5/0 • 13" RGB Monitor & Ext. Keyboard, \$4899

Mac Classic, \$920

Personal LS, \$1049

StyleWriter, \$459

# Only AE accelerators are compatible with this...



**A blank sheet of engineering paper.** For some time now, we've done all of our design work using CAD (computer aided design), but the blank sheet of paper shown above represents future AE peripherals and accessories for the Apple II line.

**Because accelerator cards** push technology close to the limit, designing new peripheral cards to be fully compatible with a given accelerator requires a special insight. That's why whenever one of our engineering teams designs an Apple II peripheral, they have to take into account the way in which TransWarp™ and TransWarp GS™ will interact with that particular peripheral device.

**Both TransWarp and TransWarp GS** were designed with future upgrades in mind (note the 40-pin high speed Bus connector on TransWarp GS). That's why Apple owners who expand and enhance their computers with Applied Engineering products have far fewer compatibility and performance problems than those who try to "mix and match". But should you ever have a question, one call to our technical

support department puts you on line with someone that knows your Apple and all the peripherals in it, making a solution to your configuration much easier.

**You've probably already read** the great reviews the TransWarps have received; *"I wasn't able to find a single piece of software incompatible with it, nor could I attribute any system problems to the card's presence."* - A+ (IIGS)

*"TransWarp is great. I have replaced all my other accelerators with it!"* - Steve Wozniak, co-founder of Apple (IIe).

*"Wait til you see it perform. Folders and icons open from the finder like lightning; text wraps instantly around graphics in your favorite desktop publishing program; documents scroll at a reasonable rate in any graphics-based word processor. TransWarp makes the GS as good as the Mac, because it's fast and it's still in color."* - Incider (IIGS)

*"Your engineering department should take a bow. As a developer and consultant, I work with the Mac II and Mac SE as well as the IIGS. I have conducted some recent tests which indicate that the "little" IIGS outperforms the Mac SE."* - George Dombrowski, Jr. (IIGS)

**Both cards offer "plug in and go" performance.** No preboot disks or complicated configurations necessary. And should you wish it to, your Apple can still run at normal speed by a simple keyboard command. So, if you'll remember us when you decide to make your Apple II run faster, we'll remember you every time we get out another blank sheet of paper.

**TransWarp GS Accelerator.....\$349**  
**TransWarp II+, IIe Accelerator...\$119**

**Order Today!** To order or for more information, see your dealer or call (214) 241-6060 today, 9 am to 11 pm, 7 days. Or send check or money order to Applied Engineering, MasterCard, VISA and C.O.D. welcome. Texas residents add applicable sales tax.

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